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Number 3.

MARCH, 1898.

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TEXTILE WORLD.

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INDUSTRIAL RECORD

The Textile World's Complete Directory of Textile Establishments, the Mill Trade and of Large Buyers of Textile Fabrics, is presented to every paid-up subscriber. 360 pages, with 19 textile maps.

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GUILD & LORD, Publishers, 620 Atlantic Avenue, Boston, Mass.

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PROVIDENCE, R. I.

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Cotton, Paper and Husk Rolls.

TENTERING MACHINES

With Patent Self-Feeding Clips.

Patent Combination Rolls

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Calenders, Mangles, Drying Machines, Tentering Machines, Hydraulic Presses, Etc.

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Short and Long Chain Dyeing, Sizing and Drying Machines.

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OIL, COMBINED "PLATE and FLAME"

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SPECIAL.

Tentering Machines with Adjustable Cam (Patent applied for) giving a uniformly smooth vibrating motion and producing a superior finish.

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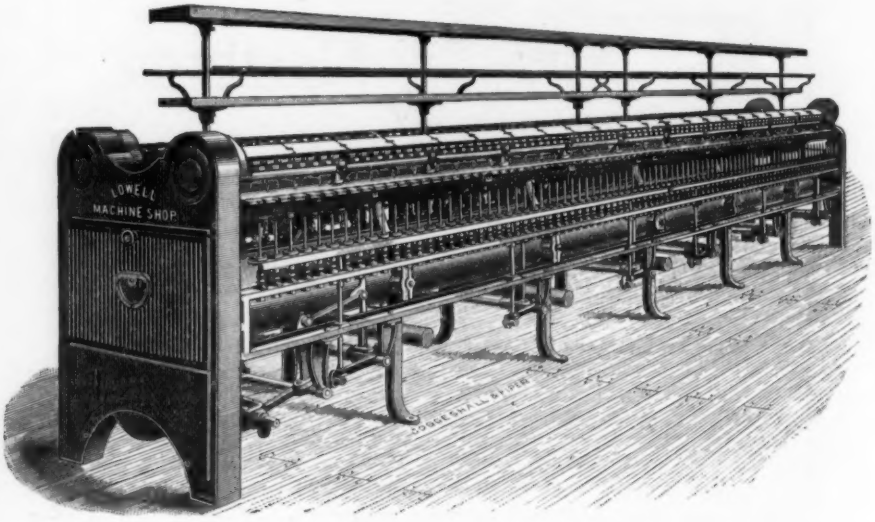

All parts are made on special tools to standard sizes and are interchangeable.

The greatest care is taken to have the frames constructed so as to obtain the greatest production with the highest speed.

All spindles are run in their bearings before being sent out.

Fluted Rolls are ground to accuracy as to their roundness and diameter, a very important characteristic for high speed.

We supply the best Separator in the market and provide all our frames with traveller clearers, lifting thread board device, cut gearing, improved roving traverse motion, heavy tin drums that don't break down, and all other parts that go with a first-class machine.

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Consideration

OF THE

Northrop

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Involves comparison with former similar innovations.

It is more expensive — yes, and so is the plain power loom more costly than the hand loom which it displaced.

Why not return to hand looms and get a cheap equipment also giving more laborers employment? The conservative should be more consistent.

Why do mills that have adopted our High Speed Spindles hesitate about using this loom? It will save them more than the entire cost of the spinning on which our spindles only gained a fraction.

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Railway Heads,
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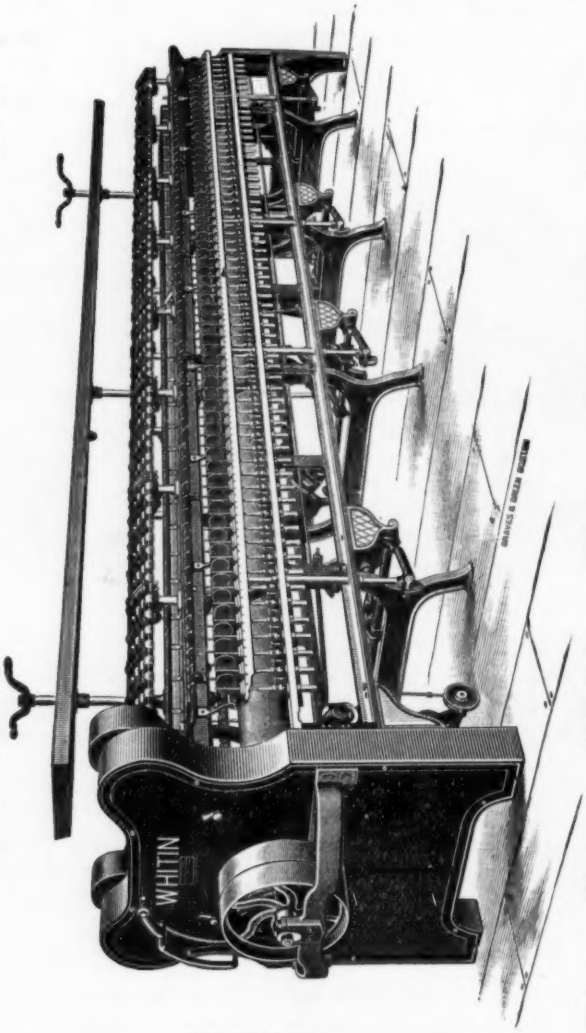

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S. W. CRAMER, Southern Agent.

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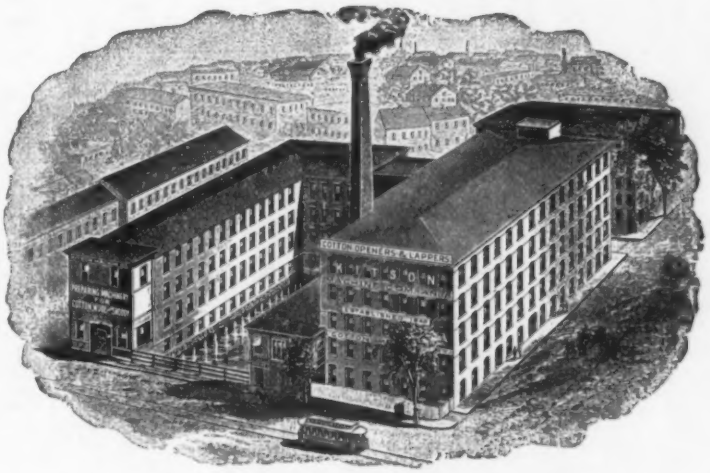
Won't Do!



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MASON MACHINE WORKS,

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COTTON MACHINERY

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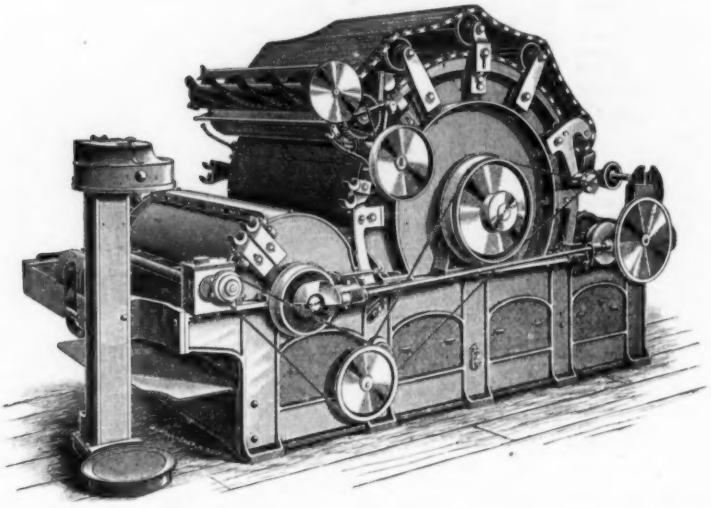

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SOUTHERN AGENCY:

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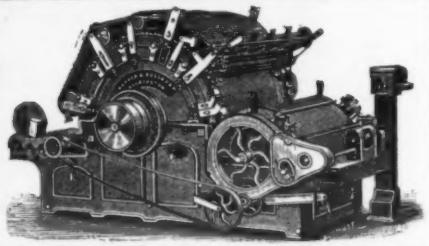

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(LIMITED),

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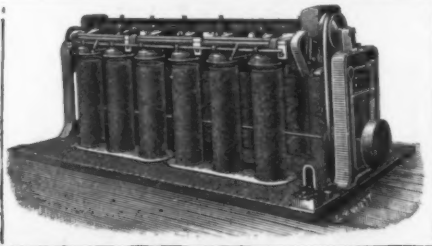

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New patented Differential motion, New Arrangement of Cone Drums, New System of Balancing top or bobbin rail, etc.

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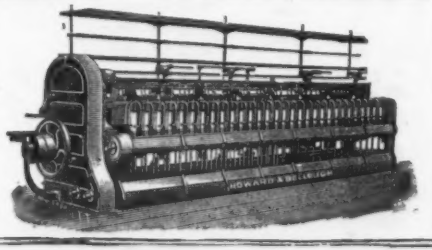

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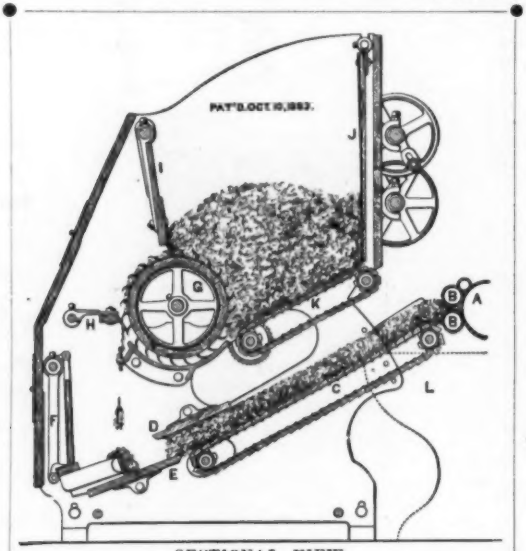

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It is built in all sizes and guaranteed as represented.

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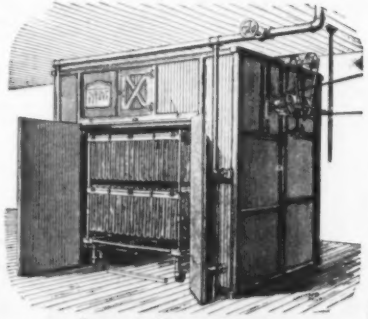

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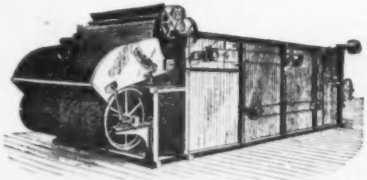

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Makers of **LOOMS** for Plain and Fancy Weaving.

Also Shafting, Hangers, Pulleys and other appurtenances for the TRANSMISSION OF POWER.

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THE VULCAN CAN.

BODY—Vulcanized Fibre. **SIDE SEAM**—Riveted with Patent Clinched Rivets. **RINGS**—Tinned Steel, Brazed Joints, Curled Edges. **BOTTOM**—IXXX. Tin Star Corrugation: Fastened without the use of nails or screws, will not crack, warp or shrink and cannot come out. **FINISH**—Coated inside and out with moisture proof coating, handsome and smooth. **WEIGHT**—About one half pound per inch diameter. **SIZE**—All cans to an exact size, perfectly round and true. **DURABILITY**—Superior to any other Can.

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"1894" pattern with Patent Flexible Bend with slots for direct setting of the flats to the cylinder by the gauge, and McConnell & Higginson's Patent Grinding Apparatus for grinding the flats from their working surfaces.

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The weight can be taken off and put on to the middle rolls, without stopping your frames, when long staple cotton is used.

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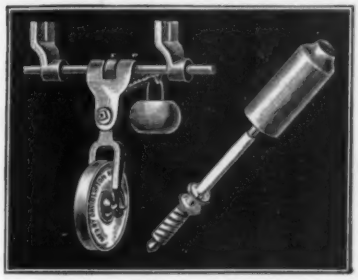

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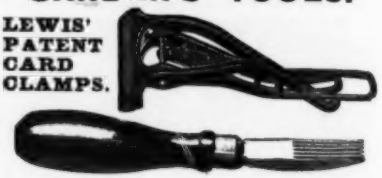

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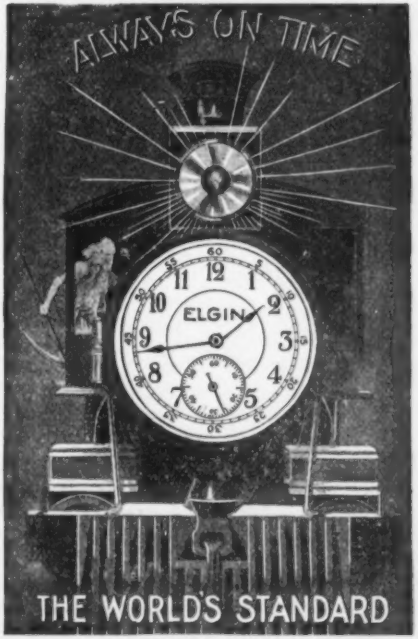

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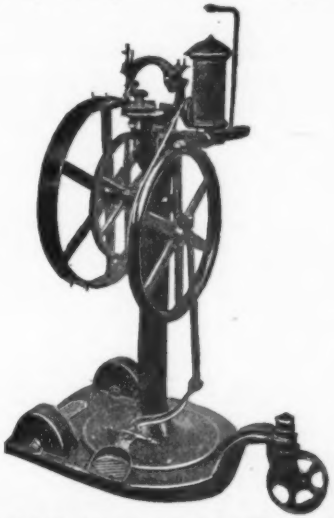

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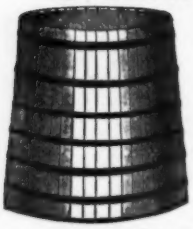

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—A list of dividends declared by the Russian cotton spinning and weaving companies, for 1896, received from St. Petersburg, indicates that the shareholders have had little to complain of with respect to the results of their investments. The highest dividend was that of the New Cotton Spinning Company, 17 per cent., or 175 roubles per share, as against 150 roubles per share for 1895, and 180 roubles per share for 1894. The Russian Cotton Spinning Company declared 14 per cent., or 20 roubles per share, as against 25 roubles for 1895 and 1894, respectively. The Nevski Yarn Spinning Company also declared 14 per cent., or 50 roubles per share. No dividend was declared by this latter company for 1895, the total profits of that year having been appropriated to the depreciation account; but for 1895, a dividend of 150 roubles per share, and for 1894 a dividend of 100 roubles per share, were paid. The Petroff Spinning and Weaving Company declared 14 per cent., or 100 roubles per share, as against 125 roubles per share for each of the two preceding years. The Sampsonieff Cotton Spinning Company declared only 6 per cent., or 60 roubles per share, as against 80 roubles for 1895, and 60 roubles for 1894. The Schlusselburger Chintz Manufacturing Company was the only concern of the group which declared no dividend for last year, and in this case also no dividend was distributed for either of the two preceeding years.

—The British and Indian manufacturers have so far had the monopoly of the sale of shirtings and sheetings. However, a competition has set in now, as the Russians have also begun to export these articles. By means of the new customs regulations, the Russians have managed to drive out Anglo-Indian shirtings and sheetings from Bokara, where there was a large demand for them.

—The weight of the oil present in carpet yarns varies according to the quality of the wool; but it is generally understood that from 10 to 12 or even 15 per cent. is a very fair amount.

PATENTS

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U. Patent Office to enter the firm.

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HOPEDALE, Mass., January 2d, 1896.

Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents.

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PATENTS

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List of Textile Patents.

Issued January 18 and 25, February 1, 8 and 15, 1898.

Specifications and drawings furnished for ten cents each. Address W. S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Card-Teeth-Grinding Apparatus. 598,015. Ernst Schweinefleisch, Muhlhausen, Gy.

Carding Machine. 599,067. Cyrus E. Smith, Fall River, Mass., assignor to the Whitin Machine Works, Whitinsville, Mass.

Chenille to Tulle—Apparatus for applying. 598,375. Auguste P. L. Isaac, Lyons, France.

Cloth Shearing Machine Selvage guide. 598,264. Leonard C. Hollingworth, Providence, R. I.

Cloth Testing Device. 598,205. Samuel McKnight, New York, N. Y.

Cotton Cleaner and Condenser (lint). 597,751. Horatio W. Southworth, New York City.

Cotton Gin (roller) 597,999. Frederick L. Montgomery, New York City, assignor to the Montgomery Fibre-Saving Cotton Gin Co., same place.

Decorticating Apparatus. 597,993. John M. MacDonald, London, Eng.

Dyeing, [etc., Apparatus for. 597,716. Leonard Hwass, Crefeld, Gy. Assignor to G. Buschgens & Sohn, same place.

Dyestuff Black Substantive Cotton. 597,983. Max H. Isler, Mannheim, Gy., assignor to the Badische Anilin and Soda Fabrik, Ludwigshafen, Gy.

Dyeing Mixed Goods. 11,647. Henri N. F. Schaeffer, Manchester, N. H.

Fibrous Materials, Machine for Opening and Working 598,284. Alonzo A. Coburn, Lowell, Mass.

Gun Cotton, Making. 597,565. Clarence Quinan, Pinole, Cal.

Knitting Machine Feeding Mechanism. 597,794. Frank Wilcomb, Pawtucket, R. I., assignor of one-half to Amsden H Smith and George H. Lumb, same place.

Knitting Machine Needle. 597,488. Wm. T. Rowlett, Leicester, Eng.

Loom. 598,187. William Weaver, Norwalk, Conn., assignor to the weaver Jacquard and Electric Shuttle Co., same place.

Loom for Cross-Weaving. 597,856. Isaac E. Palmer, Middleton, Conn.

Loom, Hand. 597,763. James M. Deen, Harlan, Ia.

Loom Lingo. 598,865. Thomas Halton, Philadelphia, Pa.

Loom Temple. 598,808. Ludger Painchaud, Salem, Mass., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Loom Temple. 598,810. Robert P. Pearson, Gloucester City, N. J., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Loom Shuttle. 599,051. Peter Ashby, Valley Falls, R. I., assignor to John Shambow, Woonsocket, R. I.

Loom Shuttle, Self-Theading. 598,480. James H. Northrop, Hopedale, Mass.

Measuring Machine (cloth). 597,836. Wm. E. Carpenter, Calumet, Mich.

Measuring Machine (cloth). 597,824. Hanover E Pitts, Nora Springs, Iowa.

Pile Fabrics, Apparatus for Cutting the pile of weft. 597,619. Geo. Roger, Warrington, Eng.

Pile Fabrics, Apparatus for Cutting the pile of weft. 597,620. Geo. Roger, Warrington, Eng.

Pile Fabrics, Mechanism for Cutting the pile of weft. 597,658. Geo. Roger, Warrington, Eng.

Printing Fabrics. 599,134. Thomas F. Stimpson, Providence, R. I., assignor to the Silver Bleaching and Dyeing Company, same place

Spindle Bearing. 597,690. Eppa H. Ryon,

(Continued on next page.)

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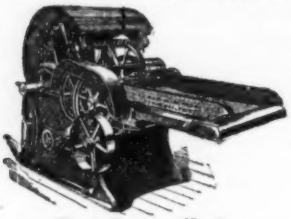

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This machine is provided with steel toothed cock spur feed roller, driven by compound gearing.

The teeth in the cylinder are made of best steel and are securely fastened in their places.

The grate under the cylinder is made of round bars geared together so that they revolve, preventing the grate from choking.

The gears are covered and the machine provided with adjusting screws to take up the wear.

There is a door at the side for the convenient removal of the dirt and to provide draught.

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The 40 inch Picker is driven by two belts from a countershaft which accompanies the machine.

We also make a light pattern 18 inch Picker for small mills.

Send for our illustrated catalogue telling all about our complete line of woolen

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(Continued from page 19.)

Waltham, Mass., assignor of one-half to A. M. Goodale, same place.

Spinning Machine Spindle. 597,691. Eppy H. Ryon, Waltham, Mass., assignor of one-half to Alfred M. Goodale, same place.

Spinning Ring. 598,200. John C. Gilbert, Worcester, Mass., assignor to Edmund L. Parker, same place.

Warping Machine. 597,871. Robert Atherton, Paterson N. J.

Warping Roller. 597,956. John Cocker, Philadelphia, Pa.

Woven Fabrics. Device for Separating and removing threads from. 598,732. Annie G. Leonard, McMinnville, Tenn.

Woven Fabric for Tubular Articles. 597,672. Wm. B. Fittz, West Boylston, Mass.

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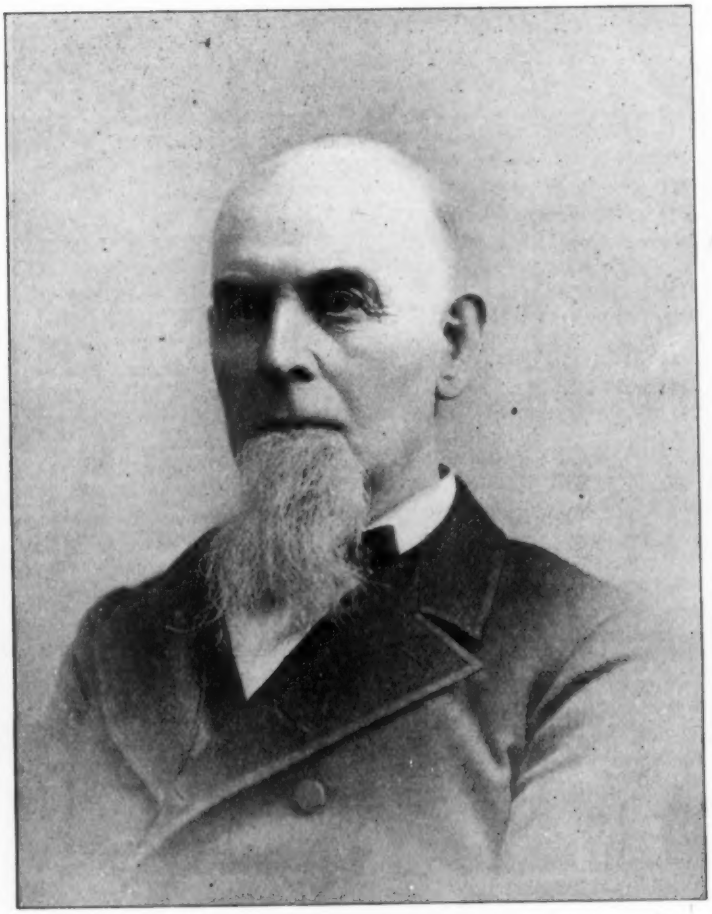

ALBERT L. SAYLES.

TEXTILE WORLD.

Vol. XIV. MARCH, 1898. No. 3.

ALBERT L. SAYLES.

Albert L. Sayles, Pascoag, R. I., died January 30, 1898. Mr. Sayles was born in Burrillville August 29, 1826, and was the son of Hardin and Roba (Wood) Sayles. He was the eldest of a family of six children. The other children were: Maria M., Elliot S., Hardin R., Ellen A. and Addison C.

Mr. Sayles represented the third generation of a large family of successful manufacturers in Rhode Island. He was a lineal descendant of John Sayles, who came to this country from England, in company with two brothers, some time previous to 1650, in which year he married Mary, daughter of Roger Williams. The grandson of John Sayles was Richard Sayles, who in 1731 was town clerk of Smithfield. His son, Israel, married Marsa Whipple and lived in Glocester. Their youngest son, Daniel, the grandfather of the subject of this sketch, was born in Glocester, in that part which is now included in this town, October 31, 1769, and died January 25, 1849. He married Phebe, daughter of Captain Pitts Smith. They had nine children, the oldest being Hardin, the father of Albert L.

Albert L. Sayles attended the common schools until 15 years of age when he entered his father's mill. Two years later he obtained employment with Daniel S. Whipple at Gazza, where he remained three years, during which time he obtained a thorough knowledge of the art of manufacturing and finishing woolen goods. He then returned to the mill of L. Copeland & Co. of which firm his father was a member, and in 1848 took charge of the finishing department. Upon the retirement of Lyman Copeland in 1850 he became superintendent, and this position he held until 1853 when he purchased the interest of his uncle, Pitts Sayles, and the firm was changed to Hardin Sayles & Son. In 1861 his father died and the business was continued under the same firm, his mother, his three brothers and one sister retaining their interest in his father's share of the business.

In 1865, Mr. Sayles built the large stone mill and fitted it up with new and improved machinery. Buying out the other heirs, except one, in 1880 he further enlarged the capacity of the mill to 15 sets.

In 1874 he purchased the Sibley mill at Warren, Mass., which has been operated by himself and son-in-law, William A. Jenks, under the firm name of Sayles & Jenks. The original structure was destroyed by fire some years ago but has since been rebuilt and is a model establishment in every way.

The mill at Pascoag is the largest in that town and is considered a model establishment. His two sons have been associated with him there for some time, the title of the firm being A. L. Sayles & Sons.

Mr. Sayles was also interested in the firm F. L. Sayles & Co., which operates the mill owned by A. H. & F. L. Sayles in that place.

Mr. Sayles was, during his life, interested in many enterprises; and to his successful business career and the enterprises promoted by him, is due much of the prosperity of Pascoag. He was one of the prime movers in originating and building the Providence & Springfield railroad, was one of the largest stockholders and has been a director ever since the organization of the company.

At the time of his death Mr. Sayles was president of the Third National

Bank of Providence and a director in the following institutions: Pascoag National Bank, the Providence and Springfield railroad, the State, Hope, Whatcheer, American and Enterprise Mutual Life Insurance companies. Mr. Sayles never sought or held public office, preferring to devote his time to his business. He was, however, a delegate to the National Republican convention in 1888 and was a member of the State House commission. In addition to the institutions above named Mr. Sayles had large interests in a number of other enterprises.

Mr. Sayles married December 1, 1852, Fannie J., daughter of David and Harriet P. (Benson) Warner of Uxbridge, Mass. To them were born four children: Edgar Franklin, who died at the age of 3 years, Ellen Maria wife of William A. Jenks, Albert Hardin and Fred Lincoln. Mrs. Sayles died January 16, 1893.

Mr. Sayle's life was remarkable and his career illustrates what patience, industry and perserverance may accomplish. When he started in life the balance was on the wrong side of the ledger, but he succeeded; probably beyond his fondest expectations. His thrift and success illustrates that this country affords the best opportunity for a young man of any in the world, and should inspire patriotism in us.

FOREIGN COMMERCE.

According to the recent report of the Bureau of Statistics, Treasury Department, Washington, the total value of imports of merchandise for 1897 was $742,631,350 ($377,329,110 free of duty, and $365,302,240 dutiable). The total value of the exports of merchandise amounted to $1,079,863,018, leaving a large balance in our favor. In the value of our exports, 67.63 per cent. consisted of agricultural products, and 25.89 per cent. of manufactured articles.

The imports of cotton amounted to 58,697,865 pounds, at an average value of 10¾c. per pound, against 47,318,524 pounds, in 1896, mostly Egyptian. A very interesting showing is made in the imports of raw or manufactured silk, indicating a remarkably good condition of our silk manufacturing industry. The demand for foreign silk in 1897 amounted to $29,520,394, against $16,096,681 in 1896, showing an improvement in the demand for raw material, by our manufacturers, of nearly 84 per cent. Most of the silk was obtained from Japan and China. There was only a slight increase in the value of imports of manufactures of silk, in 1897, as compared with 1896, amounting to about two per cent.

In our exports, it is noted that the demand for American bicycles in foreign countries on a considerable increase, amounting in value to nearly seven million dollars in 1897, against four million dollars the previous year, the demand coming chiefly from England and Germany, though many machines are sent to other parts of Europe. Even Australia appears as a good customer.

Those who have followed the trade reports as they have been published, during the past year, have undoubtedly been impressed with the demand that is rapidly growing for American products made from iron and steel. The demand for bars and rods of steel amounted to nearly twenty million pounds in 1896, while in 1897, it amounted to nearly eighty-eight million, an increase of 358 per cent. Should the export of wire be added to this, a much more favorable showing could be made. American builders' hardware is in good demand from foreign sources, and wherever it goes it meets with favor.

—Taffeta weave is the distinctive mark of the season in German silks, and beside this, armure and faille weaves stand out prominently.

—From the fact of the centrifugal force regulating the tension in the yarn, several statements might be formulated; for instance, the tension is as the square of the speed of the spindle and in direct proportion to the weight of the traveller and the diameter of the ring.

Textile World

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Suit and Cloak Makers,
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Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

TEXTILE SCHOOLS IN MASSACHUSETTS.

The State of Massachusetts and the textile manufacturers of New England have reached a point where they fully realize the importance of thorough training in textile education, for the maintenance of the superiority of textile manufacturing throughout this community. Massachusetts has taken the lead, and a most commendable one, too, in the establishment of one of the finest educational institutions of its kind in the world, at Lowell. It is one of the prides of the Commonwealth, and great credit is due to all concerned, legislators, trustees, director and instructors. Every assistance that can be legitimately given to the support, not only of this school, but of textile education in general, should be undertaken, whether it be by state, municipality, or individual effort. The textile school at Lowell had in the beginning, an appropriation by the State of $25,000, for its establishment, in addition to a like amount contributed by the City of Lowell, and the gifts of a number of machinery builders, to the estimated value of $50,000. Those who have looked into matters of this kind, know very well that a technical institution which has for its main object the training of young men, to become skillful manufacturers, for the good of the industry, cannot be self-supporting. Should any attempt be made in this direction, the tuition fee would have to be so high as to practically destroy the usefulness of the school and defeat its true purpose.

Knowing the non-self-supporting character of such an institution, the Lowell school has come before the legisature of Massachusetts, asking for an appropriation of $100,000, in order to complete the equipment and maintain the school during the next three years. In addition to the revenues from tuitions and other sources, the expenditures from such a fund would be as follows: $50,000 for the current year; $25,000 for 1899; and $25,000 for 1900. The reason for asking this aid for three years is that the

school can thus be put in proper financial circumstances to make contracts with instructors, with the assurance that the pecuniary obligations of such contracts can be carried out. We trust that the legislature will give this petition most favorable consideration. We might state that Fall River and New Bedford have also appeared before the legislature to ask for assistance in the establishment of textile schools. Fall River asks for a direct appropriation of $100,000, without any effort on the part of that municipality to comply with the statute, in which the State will furnish $25,000, provided a similar amount is raised from local sources. New Bedford, however, proposes to take advantage of the statute and asks for the necessary appropriation of $25,000. This latter request is now in the Senate, and will doubtless pass without debate.

It seems unnecessary, at this time, to say a word in favor of technical education in this country. It is becoming well recognized as a needful incentive to our manufacturing industries, for promoting their usefulness and supremacy. This is particularly appreciated in the manufacturing communities. To a New England audience, it should require no advocate to show what an important influence it has upon everything pertaining to a high standard of manufacture. In the principal countries of Europe, the indispensability of such schools is so highly estimated that they are supported not only by the municipalities in which they are located, but by the national goverment. These schools, wherever they may be found, are based upon modern economics and art, and are at the foundation of all industrial developments so conspicuously demonstrated in Germany, the advancement of whose industries have elicited the highest encomiums, and been so great as to make the manufactured products of that country superior, in many respects, to those made elsewhere in Europe. In recognition of the important position that is occupied by textile schools, the government of Prussia has placed them under the direct charge of the minister of commerce, in Berlin, as being significant and valuable factors in the commercial welfare of the country. Belgium has placed such schools under similar supervision. Both governments extend pecuniary help. England, as is well known, has been stimulated to action by the industrial competition from Continental countries, and gave for the first time an official recognition to the value of specific instruction in textile art, in 1889. By a singular coincidence of affairs, three million dolars were devoted, in 1890, to the advancement of technical education in England, as the outcome of defective legislation in the application of a tax on the manufacture of beer.

The political and industrial institutions of the United States depend, for their permanency and utility, upon the intelligence of the people, or those subject to the influence of the laws governing them. The expenditures for the support of public instruction in the states of this country, have always been more or less liberal, and, in 1896, the expenditures amounted to $184,453,780. Six and one-half per cent. was borne by the State of Massachuserts ($12,000,000), more than what was expended for this purpose in the South Atlantic States, from Delaware to Florida, inclusive, and nearly as much as that expended in the South Central States, including Kentucky, Tennessee and Arkansas, and the Gulf States, from Alabama to Texas. More money is devoted, or expended for free educational purposes in Massachusetts than in any other State; and it is not expected that this Commonwealth will go back upon its record for the advancement of its social and industrial status.

Small as the comparative area of Massachusetts is with many of the other States in the Union, it stands third in the importance of its manufactures, both in the amount of capital invested and the value of their products. Nearly ten per cent. of the amount of capital invested, and of the value of manufactured products, in the United States, is in Massachusetts. More than a billion dollars represent

the value of manufactured products of this State, equal to the total value of exports of domestic merchandise of the United States, for the calendar year of 1897. Five hundred thousand people are employed in these manufactures, to whom $250,000,000 are paid in the form of wages. It should require no argument to show to an intelligent person the absolute necessity of the State taking a substantial interest in the promotion and maintenance of this vast amount of wealth within its borders; and, of course, the best and really only method to pursue is to utilize every effort that will tend to elevate the skill of the artisans employed therein.

The importance of textile manufacturing to the general manufacturing industries in this State, may be realized in the fact, that twenty per cent. of the value of the manufactured products in Massachusetts are textiles. The position of the textile industry in this State, as compared with that elsewhere in the country, may be understood when it is stated that 25 per cent. of all of the employees in the textile mills of the United States are in Massachusetts. Over 26 per cent. of the wages are paid to these people, who aid in turning out over 26 per cent. of the total value of the textile products. The relative position of Massachusetts in this respect is thus estabished.

The relative status of the textile industries in this State may be further realized when it is noted that 32 per cent. of the amount of capital invested in the machinery of all of her factories and stock of manufactured goods, is in her woolen and cotton mills—nearly as much as that invested in railroads and equipments belonging to the steam and electric systems, and nearly twice as much as is invested in the telegraphs, telephones, shipping and canals of the State. It may be furthed noted that 42 per cent. of the value of land, machinery, tools and implements invested in manufactures of all kinds in this State, is represented in its textile mills. This is a most significant exhibit. The amount of money invested in the plants of the textile mills in this State are fully equal to the valuation of the lands, fences, buildings, implements, etc., given to agriculture, to which we will call further attention, as receiving material State aid. It might be well to consider that much the greater amount of capital invested in finishing establishments for textile fabrics is in this State, as compared with other states, or 25 per cent. of the total investment in all of the United States. This is in addition to the dyeing departmnets of factories, and refers only to separate establishments for dyeing, bleaching, etc.

Massachusetts is well aware of her position among her sister States, as a great manufacturing community, and that she has never turned a deaf ear to supplication for the promotion of her manufacturing greatness, or for the education of her youth in anything that will redown to her undoubted supremacy in all things dependent upon technical training. This is seen in her laws, for in 1894 the legislature provided for manual training in high schools in every city of twenty thousand or more inhabitants. This affects 23 cities, with a population of 1,500,000, where classes are established in such schools for woodworking, mechanical drawing, woodturning, moulding, pattern making, carpentry, wood-carving, etc. A particular trade is not intended to be favored, but the purpose is to teach the youth who receives the advantages of a free school education, in manual training, in which the mind and the hand will operate in proper unison. In Fall River, classes are supported through State aid. A portion of the curriculum includes metal working and the slide valve of the steam engine, etc. In order that the public schools shall be under proper instruction, teachers are educated in the best pedagogical methods, at normal schools, supported wholly by State appropriation, which amounted to $187,444, in 1897. The State has gone so far as to establish a normal art school, and for its support, appropriated, in 1897, nearly $20,000, for

instruction in pure art and industrial art, in full recognition of the immense importance to the welfare of the industries of the State that the artistic sense shall be properly developed. To carry out more fully this State policy, special instruction is required by law to be given in industrial drawing in public schools; and to see that it is properly done, a special agent of the State Board of Education is engaged and paid to look after this, a portion of his duty being to impart proper instruction and give direction to studies relating to color, elements of ornamentation, and decorative design. This is in direct line with what the Lowell Textile School is undertaking, only applying it more specifically to a particular industry.

We have alluded to the relative importance, statistically, of the manufacturing and agricultural pursuits in this State. We would further state that the value of the farm products of Massachusetts scarcely exceed $30,000,000, against $200,000,000, as the value of the products of our textile mills. In order that the agriculture of this State shall be properly encouraged and looked after, the State sees fit to annually appropriate a considerable amount of money for the support of a secretary of agriculture ,at a salary of $2,500, for bounties to agricultural societies ($21,000), for an experimental station at Amherst ($10,000), for free scholarships at the Amherst College ($10,000), for practical and theoretical experiments at the same college ($5,000), besides for clerical and other help, making in the aggregate over $165,000, as the amount of the appropriations for 1897. This includes an item of $200 to be expended for "nails and spikes to be driven into certain trees, designated by the authorities of the cities and towns, for the purpose of preserving and maintaining shade trees in the public highways." Everything, apparently, is done to support the farming industry, in which less than $140,000,000 appear as the value of land, fences, buildings, and implements, and which gives an annual product, as already stated, of $30,000,000. There is not a word to be said against this action of the legislature; but, are not the textile industries of the State in their educational needs, of equal importance to require some help, little as has been asked?

The petition of the Lowell Textile School is in harmony with similar requests which have been granted by the legislature. For instance, the Institute of Technology, of Boston, received assistance from the State in the way of an appropriation, to the extent of $29,000, in 1897, to which no conditions were attached. This institution is at present receiving $25,000 a year from the State, being the third of a series of six years covered by an act of 1895. The Worcester Polytechnical Institution receives annually from the State, $3,000.

In passing, it may be well to allude to the pecuniary assistance that is given by the State of Pennsylvania for special instruction in textile art, and incidentally for the support of the textile industries within that State. The textile school at Philadelphia is a part of the School of Industrial Art of the Pennsylvania Museum, and whatever assistance it receives comes through the institution as a whole. This institution has an annual appropriation from the city of Philadelphia, of $7,500, and the last two or three legislatures have given it $20,000 a year. It receives from the fees of pupils about $15,000 a year, making rather more than $40,0000 income; but, of this amout, some $15,000 goes to pay the interest on a mortgage, so that it actually has about $27,000 a year to spend. Of this amount, considerably more than one-half is devoted to the textile school, and the rest to the art school, in which, however, there are about four times as many students as there are in the textile department, so that the cost per capita of conducting this latter school is very much greater than that of the art school. If the State of Pennsylvania recognizes the importance of the principle of contributing something annually for the support of a local textile school, it seems to be more than incumbent upon the State

of Masschusetts to do likewise, because the textile industry in this State is more closely identified with its indusrial existence than can be said of that of Pennsylvania to the industries of that State. Not only this, but the textile industries of Massachusetts are pretty evenly distributed throughout the State, with large amounts of capital invested, not only in its eastern, but also in its western parts. Eastern Massachusetts is not to be benefited alone, because the western part is as much interested in what is asked for, when it is considered that some of the finest and most diversified products are made in that section, such as lenos, lawns, fancy goods, ginghams, damasks, worsted coatings, suitings, carriage robes, fancy cassimeres, etc., etc. There is no section to be benefited over another. This is not the case with Pennsylvania. Scarcely no textile industries, none of any amount, exists west of Harrisburg, but all, or nearly all, are confined to the extreme eastern section. Now, if the legislature of Pennsylvania recognizes the importance of this industry to the whole State, though confined to its eastern portion, how much more should Massachusetts recognize its importance, when so evenly distributed throughout the Commonwealth. In this connection, we might also state that, in line with this policy practiced by Pennsylvania, a bill was passed during the 1897 session of the legislature of that State, appropriating, for building purposes, $50,000, to the Phiadelphia Museums, of which Dr. William P. Wilson is director.

The fact that a school is established at Lowell, Mass., is not an affair that concerns that city and vicinity alone, but the whole State. The school is, in a sense, a local affair, with Massachusetts as the locality, and not the city alone. The city of Lowell is certainly a most desirable location for a school of this kind, as over thirteen per cent. of the capital invested in Massachusetts, in manufactures of all kinds, is in the vicinity of Lowell, giving employment to over eleven per cent. of the people thus engaged, and paying out fully ten per cent. of the wages earned. The textile industry about this city is highly diversified, as will be noted in the enumeration of only a few of the goods that are turned out by its factories. For instance, in the cotton products, we have sheetings, drills, dress goods, print cloths, flannels, novelties, elastic fabrics, braids, denims, blankets, duck, etc.; in woolen goods, flannels, woolen and worsted dress goods, woolen and worsted goods for men's wear, yarns, cloakings, cassimeres, plushes, shawls, bunting, awnings, novelties, etc.; in knit goods, gauze underwear, hosiery, jersey cloth, Astrachans, stockinettes; in flax products, shoe threads, twine, dress goods; besides carpets, as ingrains, Brussels, Wiltons, in which several millions of dollars are invested; besides other industries devoted to bleachering, wool combing, wool scouring, dyeing and finishing, and the manufacture of wool hats.

To show that the Lowell Textile School is not a purely local affair, we will say that the total number of day students attending the school at the present time is 69; 54 of these are from Massachusetts; the remaining fifteen are from out side of the State, as Maine, New Hampshire, Connecticut, and Vermont, and from the South, as well as Canada. Sixty-five per cent. of the day students from Massachusetts are from Lowell and vicinity. Only 51 per cent. of all the day students are from Lowell and vicinity. About 80 per cent. of the day students are from Massachusetts, leaving 20 per cent. for those outside of the State.

We have but to repeat that we hope the legislature of Massachusetts will see that the Lowell school does not stand in want of proper pecuniary assistance.

—If a Japanese farmer is out in the field hoeing rice, let us say, and he becomes fatigued, more likely than not he goes to his little home and varies the monotony of his agricultural toil by devoting a little while to the work on the silk loom.

SUPPLY AND CONSUMPTION OF WOOL.

The imports of wool, for 1897, were larger than in any previous year in the history of the country. For the year ending June 30, 1897, they amounted to nearly 58 per cent. of the total demand of our manufacturers and the trade, to meet consumptive wants. Of course, much the larger portion of these imports came in during the six months just previous to the passage of the Dingley tarriff. In order that this may be clearly seen at a glance, we present an accompanying table of statistics showing the imports that were entered, free and dutiable, in the calendar years of 1896 and 1897. All of the wool that was admitted free of duty, in 1897, came in between the first of January and the 24th of July; and it will be seen that these importations amounted to twice the quantity of the total imports for 1896. It will be further seen that the imports were comparatively light after the passage of the tariff bill, and what was imported consisted mostly of class three wools for our carpet manufacturers. The large amount of wool that was imported during the first six months of the year has enabled our manufacturers to run upon a supply at a relatively low cost.

IMPORTS OF WOOL.

	1896.	1897.	
	Free.	Free.	Dutiable.
Class 1.....	75,370,527	192,376,666	6,449,885
Class 2.....	10,079,959	36,443,25[illegible]	506,069
Class 3.....	74,325,529	85,740,757	35,322,817
	159,776,015	3[illegible]4,560,681	42,278,801

In this connection, we present certain statistics relating to the average annual production of domestic wool, and imports entered for consumption of first and second class wools, showing the consumption of wool by our domestic mills, other than those engaged in the manufacture of carpets. For that reason, we have excluded, in our statistical presentation, third class wools. There are some interesting statistical features shown in this table, of the domestic production of wool, and the extent to which it has entered into our manufactures. It, in a measure, sustains the contentions of wool growers, that they are able to supply to manufacturers all of the wool that they need. The contention is an easy one to understand, however, when it is considered that our tariff laws in which duties have been imposed, have made it practically prohibitive upon manufacturers to obtain their raw material from sources other than domestic. Still, it is favorable to the wool industry of this country, in that the advance in the amount of wool produced is on about a parity with the advance in the amount of wool consumed from 1867 to 1894. For example, during the existence of the 1867 tariff, the domestic production increased 92 per cent., and the consumption of all wools by our mills increased 97 per cent. Under the 1883 tariff, the domestic production declined but little below the de-

	Average Annual			Percentage	
	Production Domestic Wool	Imports Ent'd for Consumption 1st & 2d Class	Consumption Domestic and 1st & 2d Class	+Increase −Decrease	
				Domestic Production	Consumption
1867-1869	166,400,000	4,980,000	171,380,000		
1882-1884	319,300,000	17,960,000	337,260,000	92 +	97 +
1889-1891	304,120,000	30,720,000	334,840,000	5 −	1 −
1893-1894	336,870,000	25,800,000	362,670,000	10.7+	8.3+
1895-1896	265,800,000	125,900,000	391,700,000	21 −	8 +
1867-1896				60 +	129+

crease in the consumption. Under the 1890 law, the production increased in excess of consumption. Under the free wool tariff of 1894, the production fell off to a marked extent, while the consumption increased.

Judge William Lawrence has undertaken to say that this presentation is faulty, in that it does not include class three wool, but as it rather favors his side, we should think that he would take it up and view it graciously. We have thrown out class three wool, simply because it does not enter into our domestic production of wool, and the demand for such must come from foreign quarters, although, in this particular, Judge Lawrence does not agree with us, as he says this country is able to supply the wants of carpet manufacturers with the low qualities of fleeces that are grown upon our domestic sheep. Even assuming that this may be true, we think it would be a difficult matter for carpet manufacturers to secure the low sorts of our domestic fleeces from those who are obliged to buy the entire fleece. If carpet manufacturers had to depend upon such sorts they would have to obtain them from the rejections made by clothing manufacturers, unless wool growers turn their attention to the raising of the native sheep of Mexico, which they are not likely to do.

TAX ON TEXTILES.

There has just been introduced into the Massachusetts legislature a resolution requesting Congress to enact laws imposing an internal revenue tax upon the textile goods manufactured in any State in the United States, where more than 58 hours of labor a week is required of the operatives employed in the manufacture of such goods, and the senators and members of Congress from this Commonwealth are requested to assist in the passage of such laws. A hearing was appointed on this resolution by the committee on federal relations, but no one appeared in support of it or in opposition, and, therefore, its true purport remains unknown. Apparently, however, the object is to meet the unfavorable conditions under which Massachusetts is laboring in the competition of its cotton manufacturing industries with those of the Southern States, where the factory hours of labor are more than 58 hours a week, or from 60 to 70 hours a week. The object seemingly is to force the Southern cotton manufacturing States to enact laws that will restrict the running time of cotton factories to the same length of time as is in operation in this State. It is, perhaps, a shorter way for accomplishing what is now proposed to be done, that of enacting an amendment to the national constitution, giving power to Congress to reguate the hours of labor in all of the States. The wisdom of introducing such a resolution is open to serious question, and even if Congress should impose such laws, as here suggested, it would be of doubtful constitutionality.

FINING WEAVERS.

A bill has been introduced in the Massachusetts legislature, to prohibit the imposition of fines or deductions from the wages of employees engaged in weaving. The bill is ambiguous, and its necessity is not apparent, so long as there exists a law similar in character, but not so drastic in its nature, that was passed by the legislature of 1892. In order that the bill proposed may be compared with the present statute, we may refer to them to the effect that the act of 1892 provides that no deduction in wages shall be made for imperfections in weaving, unless the imperfections are pointed out to the one whose wages are affected and the amount of the fine agreed upon. The bill that is now before the legislature reads thus: "No person or corporation shall impose a fine upon a weaver for imperfections in weaving. No reduction from the wages of a weaver shall be made for imperfections, unless a written notice of such imperfections, for which deductions are claimed, is first given to the weaver, and the amount of damage occasioned by the imperfections agreed to by the weaver." It may be stated in passing that in

1891 an act was passed by the legislature prohibiting the imposition of fines, whatsoever. This was carried to the Supreme Court of the State, and pronounced unconstitutional.

It will be noticed in the bill proposed that the language is, as stated, quite ambiguous, and as it stands would be very annoying to manufacturers, even if it were not pronounced unconstitutional by the courts. It first states that no person or corporation shall impose a fine upon a weaver for imperfections in weaving. That is prohibitive. Still, it goes on to state that a fine may be imposed under certain conditions. It is, therefore, contradictory, and the amount of the fine, if any, is left entirely to the option of the weaver, which, also, is practically prohibitive, for no deduction from wages can be made unless "agreed to by the weaver."

It may safely be stated that the deductions made from wages for imperfections in weaving are not excessive in the mills of this State. If such were the case, it would be impossible for mills to be operated, because it is not to be presumed that weavers will continue in an occupation where their wages are less than in other occupations into which they can go. Manufacturers, for their own self interests, must regulate the compensation for work so that it will be sufficiently attractive to secure all of the labor desired. Manufacturers do, and are, obliged to take chances, in the way of imperfections by their employees, in the work that may be done, and no system of fines can be instituted that will reimburse the manufacturer for his losses. If the grade of goods is high, the deductions for imperfections is far from being compensatory for the loss to the manufacturer, incurred in selling his goods at a largely reduced value. The difference in low grade goods is comparatively slight, and at mills where such fabrics are made, the fine system is not in vogue.

In order to show to what a slight extent the fining system is carried, it may be stated that in the Pacific Mills, for the three months ending with January last, in the production of 400,000 pieces of cotton cloth, 1706 fines were inflicted, amounting to mill per piece. Representatives of labor organizations have suggested $162, averaging less than 9½c. per fine, and averaging less than 4-10th of a mill per piece. Representatives of labor organizations have suggested discharged. This would work not only a great hardship upon the workpeople, but be wholly impracticable and brutal.

—Some of our Southern contemporaries seem to object to the statements that are frequently made that the establishment of their textile manufacturing industries is due very considerably to Northern capital, and to offset this, it is stated that not more than $16,000,000, or one-fifth of the capital, comes from Northern sources. Even assuming that this proportion is correct, which we think may be about true, we should say that Northern capital figures very prominently in the cotton manufactures of that region.

—The South seems to have become quite enthusiastic regarding the establishment of textile schools in its midst. There is, however, the danger of a multiplicity of inferior institutions of this kind. Georgia has taken an important step in this direction, and South Carolina gives promise of following, while the governor of Mississippi, in a message to the legislature of his State, suggests that a textile department be attached to the agricultural and mechanical college in that commonwealth, and recommends the appropriation of $10,000 for this purpose. The spirit of this recommendation is excellent, but it does not appear to us a judicious one, when considering that Mississippi is quite one side from the textile communities of the South.

—Shearing of Angora goats must be done as soon in the spring as the hair commences to shed. If left longer the oil in the hair goes into the body of the animal, and the hair loses its life, weight and lustre.

Textile Ornamentation.

FENWICK UMPLEBY.

Head Master Designing and Weaving Departments, Lowell Textile School.

CHAPTER V.

These evangelists embellished their manuscripts and jewelery with all kinds of devices, and when we examine them we are astonished at their remarkable and extreme richness and the ingenuity that has been displayed in arranging the figures of the designs. Letters and fine arts began to revive in the west about the eighth century, mainly through the enterprising and enlightened spirit of the English and Irish missionaries and under the fostering care of Charlemagne, who established public schools in different parts of the empire and gave his royal encouragement to all the arts, sciences and literature of his time. He sent to other countries where the sciences and handicrafts had not been so thoroughly extinguished, for teachers and professors to train his own people, and it was thus that English artistic works acquired a wide repute on the main land.

St. Bernard (Abbot of Clairvaux), who lived in the twelfth century was one of the greatest patrons of the arts and sciences of his day, and he was himself highly skilled in nearly all the formative arts, and is also credited with having devoted careful study to the manufacture of Irish vases and to the works of the English goldsmiths that found their way into the imperial Courts. Very soon after the conquest the productions of the English looms were called into demand, and consequently the textile manufacturer became very busy. English weavers, at this remote period, had made considerable advancement and were not behind-hand in their embellishments and designs. The specimens of early English workmanship which are to be seen in our public museums bear testimony and are proofs that we have, from a very early date, made garments, hangings and tapestries, and ornamented them with exquisite and ingenious designs; and the work and skill of the artificer were admired and prized by the nobility and peasant alike. We read that on great State occasions in England, ornamental fabrics and tapestries were requisite for the adornment of the streets and palaces. Such fabrics have, from the remotest ages, been valued far and near. When any one possessed these textiles they preserved them with solemn care, and when the owner of them was preparing to leave this life, he would, on making his bequests, insert in his will to whom his favorite tapestries and clothing were to be given. Richard, Earl of Arundel, in 1892, willed "to his dear wife, the hangings of the hall, which were made in London, of blue tapestry with red roses, and with the arms of my sons."

Matthew of Westminster, complaining of the ruin of the English export trade in woolen goods in his time, assures us that with these goods England had formerly supplied the whole world. This latter statement should be accepted as a little exaggerated, for the English must not take all the credit to themselves for the advancement of the textile industries. No doubt, the woolen goods of Flanders would be sold wherever the sea or river would permit them to be conveyed. About 1380, Flanders was an open market for the traders of the whole world, and it is stated that merchants from seventeen kingdoms had their places of business in Bruges, besides the strangers who repaired thither from almost unknown countries; and this may be one reason why the Flemish weavers came over to England and brought their art of weaving, or it may have been the fault of the authorities who, levying a tax on the loom, provoked the weavers to leave their native country and take up their abode in England, during the reign of Edward III., who held out all manner of inducements to them.

Fuller, writing on the offers held out to them, says: "There they should feed on fat beef and mutton, till nothing but their fullness should stint

there stomachs, their beds should be good, and their bed-fellows better, seeing that the richest yeoman in England would not disdain to marry their daughters unto them, and such were the English beauties that the most envious foreigners could not but commend them." The occupation of woolen weavers, manufacturers or merchants, became honorable and they were placed on the same footing as a landed proprietor. During this epoch (1300), Bath, Worcester, Norwich and other places, became famous for their woven productions, such as the commoner sorts of silks and cloths of wider breadth, specimens of which are to be seen in the Brooke collections; but at an earlier date, the English were noted for their needle work, a great quantity of which was produced in the nunneries. The skilful workmanship and elegance in design of these productions may be judged of from many specimens now to be seen in South Kensington; the ingenuity of these ornamental textiles was of wide repute, they were admired at home and abroad, and foreigners especially were fain to be possessed of this beautiful English work. Matilda, wife of William the conquerer, carried away from the Abbey of Abingdon its richest vestments, and would not be put off with inferior ones. Among the capes reserved for the prelate's use in the Chapel of Charles, Duke of Bourgoyne, brother-in-law to John, Duke of Bedford, there was one of English work, very elaborately wrought with many figures. At home, also, we have abundant proof of the value set upon our productions, and upon the skill of the English artizan. In the issue Rolls, it is stated that "Henry III. had a chasuble embroidered by Mabilia, of Bury St. Edmunds," and that Edward II. "paid a hundred marks to Rose, the wife of John de Bureford, a citizen and mercer in London, for a choir cape of English embroidery, and which was to be sent to the Pope as an offering from the Queen."

There are very few people of the present day that have the faintest idea of the patience, skill, money, ingenuity and length of time that must have been bestowed upon these ancient pieces of ornamental fabrics. We have considerable testimony and sufficient contemporary evidence to show that this extraordinary craving for gorgeous fabrics, and the ability and skill to produce them, were not limited to these islands, but that other nations had their highly artistic and clever workmen. Thus we read that at Giovanni and Florence, there were made certain rich vestments (after the design of the works of Antonio Pollennolo, who died in 1498), all of gold woven velvet, with pile upon pile, each woven of one entire piece and without seam, embroidered with the most subtle mastery of that art by Paola da Verona, a man most eminent in his calling, and of incomparable ingenuity, and that this said vestment took twenty-six years for its completion.

There are many other textiles which it is not our intention to dwell upon, but in passing we may say that the word textile includes all kinds of stuffs, no matter what its material, that fabrics are made from, whether from the animal, vegetable or mineral kingdoms:—wool, hair, flax, hemp, fibrous filaments drawn from plants and flowers, and the coatings of pods such as cotton, gold, silver; and last, not least, paper, a material used in other countries, and from which garments are made.

Shoes and gloves we beg to pass over with few remarks, but nevertheless they have not played a trivial part in the ornamentation of days gone by. We learn from the York wills that ceremonial shoes, worn by bishops, were a part of the Episcopal attire. They were made of velvet, or damask, or strong linen embroidered. Among the New Year's presents to Queen Mary was a pair of gloves embroidered with gold. Shakespeare, after making Antolycus chant the praises of

> "Lawn as white as driven snow,
> Cyprus black as ere was crow,
> Gloves as sweet as damask rose."

puts the following into the mouth of

the Shepardess: "Come, you promised me a tawdy lac and a pair of sweet gloves."

Quilts have also had a conspicuous part to play in adorning the habitations of our forefathers, and some of them were highly prized; we all know how our ancestors collected and preserved small remnants of fabrics and made beautiful patchwork quilts, and these they have handed down from generation to generation. On some of these coverings, at each corner, are figures representing the four evangelists, reminding us of the old nursery rhyme:

"Matthew, Mark, Luke and John,
Bless the bed that I lie on."

Robes for baptism were looked upon as sacred garments and were ornamented in the most sumptuous fashion. Shakespeare mentions them in the Winter's Tale: "Here's a sight for thee, a bearing cloth for a squire's child."

Humidifying Devices.

The importance of artificially moistening the air of cotton mills, especially in the spinning and weaving departments, is too well recognized to warrant any comments favoring the system. Such a system of regulating the humidity, as well as the temperature of the atmosphere within a mill, is well established. We do not desire to say which is the best method, or that the present ones are not capable of improvement. It would, however, be unsafe to say that perfection has been reached.

A system has been introduced in England, of late, which is apparently new; that of moistening the mill atmosphere by means of sprays of water on the exterior of the building. The system is seemingly a simple one, and its efficiency is regarded with favor by some. This exterior-spraying method is more particularly for mills in hot countries, and therefore more applicable to the mills in our Southern than in our Northern States.

A service of pipes is arranged in the uppermost story of the mill, from the main pipe of which branch pipes project to the outside of the mill building near to the cornice. These pipes have fixed at their ends semi-circular spraying nozzles, the holes in which are arranged so as to give a semi-circular spray of some 15 to 20 feet in diameter, the external portions of each spray coming together and so completing a curtain of finely-divided moisture from the top to the bottom of the mill building. The surplus water which may fall to the ground is led away either into a suitable tank or into drains. In order to get moisture into the mill, each room is provided with one or more air propellers, which force out the foul or vitiated air of the rooms and at the same time induce a current of air inwardly through the upper portions of each window of the mill. The incoming current of air draws with it, of course, the moisture from the sprays, and so brings about the required degree of humidity. The degree of humidity may be regulated by opening the windows more or less, or by regulating the forms of the sprays.

There is a growing sentiment that not only is humidification necessary, but also that more efficient means are required to carry out a better system of ventilation. Modern practice, therefore, is trending more and more in the direction of effecting humidification and ventilation by one and the same apparatus, and in addition to this the regulation of the temperature of the rooms is attempted and provided for. So far as ventilation of weaving rooms is concerned, there seems but little doubt that, in time, the recommendations of the English Parliamentary commission that took up this subject, will be carried out, of supplying to the weaving room 2,000 cubic feet of fresh air per operative. This amount of fresh air has not yet been obtained; still it is regarded as necessary to establish really healthy working conditions. In order to accomplish the objects of these recommendations for "fresh air," a humidifier has been invented in England, the principle of which is the open water trough system, supplemented by the introduction of a diffusion of fresh

air. Troughs of sizes to suit the special requirements of the room to be humidified are suspended from the ceilings, or attached to the pillars of the rooms. The troughs are made of tinned copper; outside this is a tinned iron casing with an interspace for the circulation of air. The fresh air enters at one end of the cavity from the fan tubes or pipes, and passes out through small vertical tubes about 15 in. apart, striking against a cone above the water, which delivers it on the face of a concave disc; this disc deflects the current back over the surface of the water, and the air, charged with vapor, is diffused into the room. Inside each trough is also a copper pipe, through which, when the atmosphere is unusually dry, steam can be passed to accelerate the vaporization by raising the temperature of the water. By increasing the temperature of the water, the maximum limits of humidity required can be secured, and it is claimed under the most adverse climatic conditions. The troughs are supplied with pure water at a low pressure, from a cistern which is fed from the town service main, the supply of water in the troughs being kept at a uniform height by means of sensitive ball taps thus requiring no attention and using the minimum of water.

Air is admitted by means of fans through openings in the windows, each fan being capable of injecting from 1,000 to 2,000 cub. ft. per minute. This principle of supplying an artificial atmosphere into a mill embraces all the Commission's recommendations as to purity of the source of the vapor and ventilation.

In this connection it may be of interest to allude to some extemporaneous remarks made by Edward Atkinson, in Philadelphia, at the time of the October meeting of the Cotton Manufacturers' Association, upon the subject of air humidifiers. He called the attention of his hearers to the well understood fact that a constant humidity at the right point is vital to success, in spinning fine or medium numbers, and is a factor even in the very coarsest numbers, the whole profit and loss account in many classes of goods depending upon the climatic or atmospheric conditions. The importance of this matter has led to a very wide use of mechanical devices for keeping the atmosphere in a factory in a uniform and satisfactory condition. Mr. Atkinson dwelt upon the subject in the following words:

"Let us hastily consider the reason for securing this uniformity. Each convoluted fibre of cotton will take up in its own twist and shorten in length in a dry atmosphere. It will relax and lose in twist in a saturated atmosphere. The evils of the dry east winds of England are as well recognized in Lancashire as the saturated atmosphere of our "dog days" is in our own country. Our efforts are therefore to control both extremes. Nature does not provide an absolute constant, but the variations range from a change of fourteen per cent. between morning and mid-day and between mid-day and night in the best positions, to fifty per cent. variation or even more in the unsuitable places. Our problem, therefore, is to improve upon nature.

"The fault in all the mechanical devices is that unless they can be started sometime before the spinning or the looms, an hour or more will elapse before they bring the atmosphere to the right point. This has been found to make a difference of nearly an inch in the width of standard number thirteen sheeting.

"One process has been adopted in England which has not, I think, been practiced here, namely to carry an open shallow stream of water through the rooms, developing humidity according to the heat of the room, it being remembered that the capacity of the atmosphere to take up moisture increases very rapidly as the temperature is raised. I believe that a temperature of about 70° F. will take up seventy-five per cent. moisture if a sufficient evaporating surface is exposed to its action. That condition is the one in which plants thrive, which is conducive to health and in which spinning and weaving can be con-

ducted evenly and surely. Of course, the proportion of humidity must depend in great measure upon the area which is exposed to evaporation. In any event a flowing stream is subject to many objections. The water will gradually become warm unless the current is rapid, and then I believe the evaporation is less. Can not a small amount of very cold water be exposed upon a very large evaporating surface at a higher temperature than 70°, then circulating of its own motion as the air is rendered cooler by the evaporation, throughout the area of the spinning or weaving room, thus at the same time promoting ventilation as well as humidity?

"I also devised an apparatus which seems to have been lately re-invented in Washington, for cooling the air of a room by exposing a copper chamber outside the house on the south side, open at the top outwardly and opening below at the top of a window inwardly, moistening the inside so that the hotter the sun the more rapid the evaporation, but fearing an excess of dampness, I never put the idea into practice."

The Cotton Industry of Germany.

According to Dr. von Schulze-Gavernitz, the German cotton industry is now at the stage which the English cotton industry had attained in the thirties. It is still spread over a wide area and thus loses many of the advantages which extreme concentration has obtained for the Lancashire textile trade. South Germany, and in particular Swabia, Baden, and Alsace, is the seat of the plain cotton goods manufacture; North Germany, and especially the Rhine Provinces and Prussian Saxony, that of the manufacture of printed goods. The inquiry into the condition of the German cotton industry, made in 1878, showed that since 1859 the number of spindles to each establishment had risen from 15,000 to 21,000, whilst the average number of looms was 287. Such figures, however, only represent the firms sending in returns to the Commissioners, and as these are the largest and most important, their condition cannot be taken as representative of the average throughout the country. The same reservation must be made with the statistics for Alsace-Lorraine in 1890, which give an average of 25,800 spindles and 380 power-looms for each spinning and weaving mill. In Saxony it is certainly not uncommon to find establishments with only a few hundred spindles, and the statistics of occupations of 1882 showed that this very industry, which is more highly organized than almost any other in Germany, can also show the widest development in the direction of small industries. In 1885, the English cotton mills had an average staff of 191 workpeople, whilst in Germany the average was only ten. In 1882, 42 per cent. of all textile workers were engaged in establishments employing less than five persons, and only 38 per cent. in really large factories, i.e., factories employing more than 50 hands. The relative proportion of factory and home work in the three main branches of the textile trades was as follows:—

	Factory Workers.	Home Workers.
Spinning	103,750	28,391
Weaving	171,095	178,060
Embroidery and Lace.	23,077	68,248
Total	297,922	274,699

There were, therefore, considerably more persons weaving at home than in factories, whilst home work in embroidery and lace-making shows a vast preponderance. Lack of organization in the system of procuring raw material obliges the German mill-owner to buy his cotton months in advance instead of weekly, as in England; he is thus far more at the mercy of the fluctuations of the market, without reckoning the loss of interest. Further, English mills confine themselves as a rule to one, or at the most two, specialties, but the German manufacturer has a hundred patterns, which involve frequent readjustments

of the machinery and the changes in the work of the operatives. Hence an increase in the cost of production and a decrease in the amount of the product. Similarly in Germany, spinning and weaving are often carried on in one and the same establishment. The absence of concentration and organization in the work has hindered the growth of a factory population, such as that of Lancashire, devoted almost exclusively to the particular industry and developing a hereditary aptitude for it of untold value to the manufacturer. The German mill owners complain of the lack of a permanent supply of skilled labor, and state that the workpeople often leave the mills and take to agriculture, domestic service, or artisan's work. The result is a loss of the skill already acquired and a complete absence of "the factory tradition." Alsace shows greater concentration than the rest of Germany, and it is here alone that any attempt has been made to establish works for the sole production of the machinery required in the textile trades. These works are not, however, sufficient to supply the rest of Germany, which remains for the most part dependent upon England. The only corresponding advantage, besides the doubtful benefit of lower wages, which Germany derives from the diffusion of its textile industry is the large supply of water power; but even this is being greatly neutralized by the almost universal substitution of steam as a motive power. In the selling department again, the German manufacturer loses by being his own agent and commercial traveller, and dealing often with small retail tradesmen, whose security is doubtful and who buy almost universally on credit. The general result of the difference of organization is that both in the costs of establishment and in the costs of production Germany is far behind England. Where in England the average cost of establishing a business is $5.25 per spindle, in Germany it is from $11.00 to $14.00, and where the English cost per loom is $84.00 or less, the German is $160.00 for light printed cottons, and $360.00 for glazed, twilled or patterned cottons. The cheaper coal helps the German manufacturer as far as the relative amount of the working expenses is concerned; but in the purchase of the raw material the advantage is entirely on the side of England. The same applies to the rate at which capital can be obtained in the two countries; the German mill-owner must pay 5 per cent. where the English owner pays from 2½ per cent. to 3 per cent. As regards coarse yarns, however, Germany has proved able to compete successfully with England, and even before 1878 had done much to drive the English coarse yarns out of the German markets. In fine yarns, on the other hand, England in 1891 still produced 75.5 per cent. of those used in Germany, whilst 7.5 per cent. came from Switzerland, and only 17 per cent. were of native manufacture.

There is difficulty in procuring an adequate supply of skilled labor, and the factory inspectors report a distinct increase in the employment of women and children in various districts. The more important textile districts show, on the contrary, a decrease in the matter of child labor. Compared with the English textile workers, the German operatives are less efficient, according to the best information at hand, even when all allowances have been made for the inferior machinery often used in Germany. A German manufacturer stated before the German Commission of 1878 that where in England the spindles ran 95 per cent. of the possible time, in Wurtemberg, though the rate of speed was 10 per cent. less, the time lost through the breaking of threads was 5 per cent. greater. In Alsace, the actual product was said to be only 80 per cent. of the possible product.

Even in south-west Germany, where the industry has been longest established and the degree of skill is presumably greatest, the efficiency is only about half of what it is in Lancashire, according to an English parliament report. The saving of labor effected in England in comparison with

Germany appears from the following figures:—

	Oldham.	Mülhausen.
Number of spindles in the mill..... ..	70,000	32,000
Hands employed in mixing.....	2 men.	2.3 men.
Hands employed in loosening threads	4 men and women.	7.6 men and women.
Hands employed in carding	7 men.	15.5 men.
Hands employed in drawing.....	7 women.	12.6 women.
Hands employed in slubbing and roving.....	45 women and children.	44.3 women and girls.
Hands employed in spinning.....	95 men and boys.	87 men and boys.
Hands employed as overseers	3	4
Hands employed as packers	6	12
Total.....	167	185.3
Percentage per 1000 spindles	2.4	5.8

The number of overseers required in Germany is far greater than in England; the German proportion, even under the most favorable circumstances, is one to 15,000 spindles, whilst in England one man takes charge of from 60,000 to 80,000.

In weaving, the difference between the two countries is almost as striking as in spinning. An English weaver working rapidly loses, on an average, only 16.6 per cent. of the possible time through the breaking of threads and other accidents; if he works at a less rate he loses about 8 per cent. An Alsatian weaver, on the other hand, will lose from 20 to 30 per cent., though he works 30 per cent. slower than the Englishman. Thus, in spite of the 15 per cent. shorter hours in England, the weekly production per weaver is greater. Again, a good English weaver will manage four looms at once, or, in a few cases, six, whereas in Germany one man seldom takes more than two, or in exceptional cases, three. In Silesia it has been found most economical to have a weaver to each loom.

The wages for Germany have shown a great increase since 1850, in some cases as much as 60 per cent., and the cost of production has not been sensibly increased. This is attributed to the substitution of two looms per weaver for one, the increased speed of the new looms, the introduction of payment by piece, and of labor-saving machinery.

Home Industries.

TECHNICAL EDUCATION — IRISH AND CONTINENTAL INDUSTRIES.

A Parliamentary Committee of Great Britain that was recently appointed to investigate and report on the industries of Ireland, reached a conclusion in one of their lines of investigation, that the promotion of home industries would be of great value to the people of Ireland, carried on in connection with agriculture, by persons engaged for a portion of the year in the tillage of the soil. The committee believed that there was a possibility of introducing these industries into that country by the adoption of methods employed by foreign governments. They calculated that there are only about 240 days in the year during which the men can work upon the land, and how to fill the interval for a population mainly agricultural with remunerative, wholesome and dignifying occupation, is not only an economic, but a social and moral problem of the highest interest to a nation.

Although this is an era of machinery, there are, nevertheless, many industries which machinery does not affect, and which can be carried on with profit either in the homes of a rural population, or partly in these homes and partly in small local factories. Among these industries is a large field of artistic handicrafts. There is evidence that for some years past the natural reaction of a taste against the attempt of machinery to take the place of art, is making itself felt in a general revival of those handicrafts in which the play of the individual hand and mind, in producing beautiful and decorative results, contributes the chief element of value. There is a wide field for home industries, and hand-loom weaving of linen and wool may be suggested, carried on

in connection with small local factories, and kept up to date by a supply of the newest designs, as is done in Wurtemburg.

One of the industrial phenomena of the last forty years has been the immense growth of manufacturing industries in Continental countries, largely at the expense of British trade; and that growth seems to be directly traceable to the assistance given by the State in these countries, by a technical education and otherwise, to industrial enterprise.

There exists in Ireland an agricultural country, where the problem is not so much how to foster industries, as how to introduce them. Continental experience supplies instances of countries under precisely similar conditions, where the problem of introducing industries, and creating a thriving manufacturing trade, has been successfully solved.

We again refer to the little kingdom of Wurtemburg—a country one-fourth the size of Ireland. Forty years ago, Wurtemburg, in the words of the man who had most to do with its subsequent uplifting, was "purely agricultural and impoverished by over-population." Its condition was described as "deplorable." To-day it is one of the most thriving hives of manufacturing industry on the Continent, and the British minister at Stuttgart recently reported to his government that "England now buys from Wurtemburg, blankets carpets, flannels, hosiery, linens tissues, instruments, etc." It is to be noted especially that these industries are carried on by an agricultural population, who, forty years ago were as devoid of mechanical knowledge as that of Ireland, and who, in taking to these industries, have not abandoned agriculture; but, on the contrary, have found their agricultural prosperity through the growth of a manufacturing population in other towns and villages. How was this industrial revolution brought about?

In 1851, Dr. Von Steinbeis, president of the Board of Trade in Wurtemburg, struck with the handicraft of the various nations, especially with that carried on by rural communities, as indicated by the exhibits at the London Exhibition of that year, resolved to try whether the people of Wurtemburg could not be taught to use their hands and brains to similar purposes. The government seconded his idea, and sent him on a mission of investigation through Europe. On his return, there was founded in Stuttgart, in connection with the ministry of commerce, a Board of Industries, under his presidency, and to it was entrusted the task of introducing and developing crafts and industries, and devising and carrying out a scheme and system of technical education. This Board is otherwise known as the Central Stalle, which has managed to introduce industries into different localities by sending skilled workmen abroad to acquire a knowledge of new methods in trade and agriculture, who, on their return, go about towns and villages giving instruction, and introducing foreign workmen and instructors. By a strange irony of fate, Ireland has thus contributed to the industrial elevation of Wurtemburg. Workmen and machinery have been imported from Belfast to develop the linen trade, and Wurtemburgers have been sent to Ireland to learn what the people there had to teach.

Outside of this scheme of developing industries, is a great system of technical education, beginning with the primary schools, in every one of which drawing, in connection with handicraft, is taught, and going through trade schools, etc., up to a great series of polytechnic and industrial art schools, which have now become famous, and are attended by students from all parts of the world.

It may be of interest to know how the linen industry was established in one locality in Wurtemburg, as it proves that the most successful industry for the manufacture of the highest class of goods can be carried on with hand looms, notwithstanding the competition of machinery, by a rural population, engaged part of their time in agriculture. Beautiful table-cloths, and white and colored linens, superior designs for borders, are a specialty in

the village of Laichingen. It is almost impossible to imagine a place under greater natural disadvantages for such an industry as this village. It is far from a railway station; it is situated on an elevated plateau, reached by a nine-mile pull up hill; it has to import its yarns from Belgium and Belfast, and to pay upon them an import duty of 15 per cent.; yet these industrious people by sheer force of technical and artistic knowledge and skill are producing the most beautiful articles in their trade, not merely for the supply of their own country, but for export to America and other foreign lands. The linen industry had for some time past existed here and in neighboring villages, so far as the production of plain and coarse goods was concerned. But is was about being extinguished, like the linen industry in Drogheda, by the competition of the power looms of other countries, when, in 1855, Dr. Von Steinbeis and his Department came to its relief. Irish linen-weavers were brought to Laichingen and Laichingen men sent to Belfast. Machine-made instead of home-spun yarns were introduced from Ireland and Belgium; a teacher of design and a weaving instructor were provided by the government and a small allowance was made to clever young men to induce them to remain longer than usual under instruction. A joiner was sent from Laichingen to Vienna to learn the manufacture of Jacquard looms. The Central Stalle sent representatives to foreign exhibitions to procure samples of the best materials and designs, and lent them to the makers. So rapid was the improvement that, at the Exhibition in London, in 1862, the produce was considered equal to the Irish. Merchants in Stuttgart were induced to co-operate. They provided looms and materials, paid the weavers' wages, and took all the produce. By this combined operation more improvements in the trade were effected, and better wages were paid for the higher class of goods produced.

Again referring to the Central Stalle, it may be well to note that it takes care, while encouraging private enterprises, never to supersede it. It gives advice; it advances money for the establishment of industries; it introduces schools for the teaching of trades; it sometimes starts industries itself, but always on lines which eventually lead to the absorption of these industries by private enterprise in the form of companies or associations. It keeps in close touch with the trade organizations of the country, with the merchants, and manufacturers, and with the municipalities and local authorities; and in the schools which it establishes it throws the responsibility of management upon local committees, and requires that the localities shall contribute to their support in proportion to the government grants. A guiding principle of its action is that more is to be gained by practical assistance in the development of industry than by theoretical instruction. In teaching a handicraft, it has always been careful to promote an industry in the locality, and to find it a market.

The Utilization of Waste Products.

There appeared in the December number of Cassier's Magazine, an article on the use of city refuse as fuel, which is deserving of consideration, being in line with the progress that is made in science, by which waste products can be utilized economically for industrial purposes. Perhaps there is no stronger evidence of the advance of civilization than the increasing tendency manifesting itself in almost all directions, toward the utilization of waste products. The immediate incentive to this, of course, is the simple one which lies behind all commercial projects, the desire for the emoluments of trade; but it is the increasing ability to turn to commercial account those products which were before worse than a mere waste (in that their disposal was a source of expense) that is the index of civilization's advance.

No better example of this can be cited, perhaps, than the utilization of the waste products in the manufacture of coal gas. Take a single one of

these, coal tar, for example, which, by the way, is a very complex and uninviting substance. It has given us one of the best antiseptics known to science in the shape of carbolic acid, one of the most violent explosives used in warfare, picrate of potash; a whole series of colors and dyes, the anilines rivalling in brilliancy and splendor the colors of the rainbow, and these have not only given rise to new industries of great magnitude, but have revolutionized others of vastly greater extent; many of the most delicious of our so-called fruit flavoring extracts; saccharine, a substance two hundred and thirty times as sweet as purest of cane sugar, and last, but not least, a series of medicinal preparations of the greatest value to suffering humanity, of which antipyrine, antifebrine, and sulphonal are names that will be familiar to all.

The rendering of dead animals into fertilizers, glue, etc., the conversion of sewage and garbage, offal, etc., into fertilizer, and the conversion of rancid fats into soaps, are all examples of this class with which the public are familiar. But what would we say if we were told that recent developments have made the filth that collects in dark places furnish light for those same dark places, nay, even more, become the source of light by which the poor may the better educate themselves; that the refuse from the households where the most rigid economies become necessities and the disposal of which costs municipalities thousands annually with no other return than the improved sanitary condition of the district from which it had been collected, by furnishing hot water for baths for men and women, and for laundries where clothes could be cleansed and dried; to light the whole district, including public libraries and reading rooms?

This, however, is what is being done to-day in the city of London, and one, too, if reports be true, at a profit to the Vestry of Shoreditch. It was not until about 1888 that Prof. George Forbes proposed that the heat of the combustion of this refuse be utilized for raising steam for electric lighting purposes. He found that from the house refuse of any town enough steam could be supplied to generate electric light at the rate of one 16-candle power lamp per head of the population for two hours every night of the year. This statement may seem strange, but it can be verified to-day in the Vestry of Shoreditch in the City of London.

Prof. Unwin gives the fuel value of "ash-bin" refuse at about one-fifth that of an equal weight of fair coal. Carefully compiled statistics show that in Great Britain the quantity of refuse collected, varies with the locality from 100 to 400 tons per 100 inhabitants per annum, and this, when burned in destructors, is reduced to about one-third in weight and one-fourth in bulk, the residue after combustion consisting of clinkers and sharp ashes, which have a small salable value for road-making and other similar purposes.

Shoreditch is a parliamentary borough in the East Central District of London, with an area of about a square mile and a population of 124,000 souls, composed largely of artisans (35 per cent. being artisans, the highest percentage in London). On account of its dense population, the large number of public houses (300) and the number of small shops keeping open late at night, it is one of the largest light consuming districts in London, and, therefore, admirably constituted for an electric lighting district if the light could be furnished at a figure that would be attractive to the class of people living within its bounds.

Formerly, Shoreditch vestry had to pay 80 cents per ton for barging the refuse away, but now it is estimated that it costs only 30 cents per ton for burning it in the dust destructor. As the quantity of refuse obtained per year is about 22,000 tons, it will be seen that the saving in expenses of disposal of the refuse amounts to about $11,000.

The last available report of the New York Street Cleaning Department shows that for the year 1895, 1,582,287 cart loads or 4958 boat loads of garbage were taken out to sea, at a cost

for collection and cartage of 65 cents, and for final disposition on boats of 29 cents, or a total of 94 cents per cart load. If we assume that a cartload weighs about a ton, we have a means of comparison with Shoreditch and Hamburg, at which latter place it cost 35 cents per ton to run it. If, therefore, instead of dumping at sea, the lesser haul to the cremation plant would permit the treatment of the garbage for 50 cents a ton, there would be a saving of 44 cents per cart load, or an aggregate of about $696,206. There were, however, 36,196 cart loads of garbage collected, but not included in the above figure, which, at the same rate, would increase the savings to about $712,132. This is equivalent to the interest at 6 per cent. on a capital of $11,868,675, or more than sufficient, if judiciously invested, to light the whole of Manhattan Island with electric lights.

[*Reported exclusively for the Textile World.*]

Azo Colors and Some of their Applications.

Paper read by W. P. Atwood, chemist of the Hamilton Manufacturing Co., Lowell, Mass., before the Lowell Textile School, January 6, 1898. The paper was illustrated by dyeing experiments and specimens of azo colored goods.

Concluded from February.

From the diazo compound the complete, colored azo body is formed when the acid unit attached to one side of the azo group is replaced by an organic group: Azo body:—(some organic group, like naphthalene)—N=N—(some organic group like beta or alpha naphthol). The azo bodies are usually very stable colored substances and are in strong contrast to the unstable diazo compounds from which they are derived. The chemicals necessary for the production of this class of colors are, an amido compound, hydrochloric acid, nitrite of soda (to furnish nitrous acid), caustic soda, acetate of soda and a naphthol.

If it is desired to calculate the best proportions of these chemicals which it is necessary to use to produce a diazo solution, one equivalent of acid must be taken for each amido group in the amine, also one equivalent of sodium nitrite for each amido group, and in order to set the nitrous acid free which is combined with soda so that it may react on the amine, take one more equivalent of acid. This is all the acid which the reaction requires, but experience has shown that diazo solutions are more stable and keep better if there is a small excess of acid present, so take one more equivalent or three in all, bearing in mind that commercial hydrochloric acid contains only about one-third of its weight of real hydrochloric acid. Other acids may be used, but muriatic is the one generally employed. The acid diazo solution has been found to work better if, just before use, the chloride and free hydrochloric acid are converted into acetates and free acetic acid. This is readily accomplished by adding a solution of acetate of soda in small excess. Three equivalents of the acetate are all that is necessary.

The amounts of water and ice to be used must be found out experimentally, according as a strong or dilute diazo solution is required. Usually one pound of the amine base will make four to six gallons of developer.

The steps necessary to produce an azo color are,

(a) The making of a diazo solution (often called the developer).

(b) Preparation of the fibre with an alkaline solution of a naphthol, (technically known as the prepare or grounding).

(c) Development of the azo color on the prepared goods.

I will try to illustrate the production of one or two diazo solutions. The first shall be one which will give a claret shade of red.

I have a solution or rather a pulp of an amine base, made by treating alpha-naphthylamine with hydrochloric acid, the reaction may be represented as follows:

$C_{10}H_7NH_2$ (Alpha-naphthylamine) $+$ HCl (Hydrochloric acid) $=$ $C_{10}H_7(NH_2)$ HCl (Alpha-naphthylamine hydrochlorate).

To this I add ice to reduce the temperature as much as possible, and then pour into it, slowly, a solution of

sodium nitrite with constant stirring, testing with iodo-starch paper, so as to be sure that enough nitrite has been added. If there has been, a blue color will instantly show on the test paper.

The excess of acid present, sets free nitrous acid which in turn reacts on the alpha-naphthylamine hydrochlorate and converts it into diazo-alpha-naphthalene chloride, according to their reaction below.

$C_{10}H_7(NH_2)HCl$ (Alpha-naphthylamine hydrochlorate) $+ HNO_2$ (nitrous acid) $= C_{10}H_7 - N = N - Cl$ (Diazo-alpha-naphthalene chloride) $+ 2H_2O$ (water).

I wish to call attention to the fact that the azo group has been formed and that it is united on one side to the organic group naphthalene and on the other to an acid unit of chlorine, as required by our definition of a diazo body.

If we try to use this solution just as it is, it will be found to be so strongly acid that the claret will not develop well at all, so, as already stated, I will finish the solution by adding the necessary amount of sodium acetate.

The diazo solution is now ready for use. It is not necessary to write out this reaction, since we simply have diazo acetate in place of the diazo chloride.

I will also make another diazo solution starting this time with paranitraniline, and by just the same method of procedure convert it into diazo-paranitro-benzene chloride.

I have also prepared a diazotised solution of meta-nitraniline and benzidine.

Before using the above solutions it will be necessary to describe briefly the second step, viz: the preparation of the goods which may be either cloth or yarn. I can best illustrate, however, by using cloth. It is not convenient to perform this before you, so I have previously prepared the cloth which I shall use this evening. The prepare or grounding is made by adding a solution of caustic soda, usually at 30° or 36° Tw. to the dry beta-naphthol in the proportion of about two equivalents of the alkali to one of naphthol, then a little hot water, and when all has dissolved making up to the required volume with water. The degree of dilution will vary according to the kind of work and depth of shade required. Usually one pound of naphthol will make four or five gallons of "prepare." A small amount of thickening is sometimes added. In most of the receipts for naphthol groundings, you find the addition of Turkey red oil or castor oil ammonia soap recommended. My experience has been that it is not needed for clarets, and paranitraniline scarlets, although the tone of the latter is bluer when oil is used.

Oil is necessary when preparing goods for dianisidine blues. The goods must not stand long after preparation with the alkiline naphthol solution, since they are apt to become discolored by exposure to the air, so it is better to use the cloth the same day it is prepared.

The third or final step is the development of the color. This is usually accomplished by passing the prepared goods through the diazo solution in a padding machine, washing in water, soaping and drying.

I could, of course, illustrate this by dipping patches in the diazo solution, but I think you will all see it better if I brush the solution upon the prepared cloth, which amounts to the same thing. I have accordingly prepared pieces of cloth with alpha and beta-naphthol, sewn them together, and stretched them upon a frame. The upper half has received the beta and the lower the alpha prepare. I now brush the diazo-naphthalene solution across the double patch. You see that a claret or garnet color is immediately developed on the beta ground, and a dark brown on the alpha half. What has taken place on the beta ground may be represented as follows:

$C_{10}H_7 - N = N - Cl$ (Diazo-alpha-naphthalene chloride) $+ C_{10}H_7NaO$ (Beta-naphtholate of soda) $= C_{10}H_7 - N=N-C_{10}H_6HO$ (Alpha-naphthalene-azo-beta-naphthol) $+ NaCl$ (Sodum chloride).

The sodium of the beta-naphtholate has combined with the chlorine of the

diazo chloride, to form sodium chloride, the sodium being replaced by hydrogen, while the naphthol unit has linked itself to the azo group. You will notice that the azo group has now an organic group on either side and so conforms to the definition of an azo compound, which in the present case happens to have a claret or garnet color. This is one of the most important colors produced by the process which I have tried to describe.

The second solution, used in the same way, produces a red on the beta ground and an orange brown on the alpha. Without troubling you with any theoretical considerations we will simply call the first para-red. This azo color has had an extended application and may be found in the market sometimes labeled "Turkey red, warranted to wash." It is only fair to state, however, that most manufacturers are too conscientious to label it so. It is brighter but not so fast as genuine Turkey red. A bluer shade of red, more like Turkey red in tone may be produced by diazotised beta-naphthylamine on a beta-naphthol ground. This color is important, but not so much so as on the para-red.

I now apply the diazotised solution of meta-nitraniline in the same way producing an orange on the beta ground, and a brown on the alpha.

When the diazotised benzidine is applied in the same way, a dark chocolate color, so intense as to be almost black, develops on both grounds.

Diazo solutions require great care in making and are very particular things to run. Apparently little things make them go wrong. I have not time to go much into detail, so will only add that when making diazo solutions, be sure that the hydrochlorate of the base, if in the form of a pulp or paste, is in as finely divided a state as possible, and before diazotising, see that the solution is perfectly cold and that the base is fully diazotised. This is of especial importance and it is well to test frequently with iodo-starch paper to make sure that there is really a slight excess of nitrous acid present

Finally be sure that enough acetate of soda has been used. It is better to err, if anything, in the liberal use of acetate, since, if too great an excess of mineral acid has been accidentally used, there will be enough sodium acetate present to take care of it, and you will not have to spoil goods to discover the mistake. At all times exercise a rigorous control of all the ingredients. I think it a safer plan to weigh out the solutions than to measure them, since the personal error is less in weighing. Of this class of colors, especially, may it be said that eternal watchfulness is the price of success.

It is evident that if the diazo solution be thickened and printed upon the prepared cloth, the same colors must result, but with this difference, that the printed colors are usually not quite so bright and bloomy as the dyed shades. The effect produced will be that of a white object on a colored ground or a colored object on a white ground, according as the goods are more or less covered by the azo color. It is interesting to note that, as a rule, the richer the amine compound is in carbon the darker the shade. As an example, an aniline on a beta napthol ground gives an orange, but that benzidine which is simply the doubled aniline molecule produces a dark chocolate shade, on the same ground.

It is only necessary to notice the different colors produced by diazotised alpha-naphthylamine on alpha and beta naphthol grounds, in order to appreciate the importance of having the beta naphthol pure and free from the alpha compound, if we wish to get pure bright shades of claret.

Let us consider some further applications of this style of work. You have seen how white and colored effects may be obtained by printing diazo solutions. There is, however, another way of producing white and colored objects on azo dyed grounds. I refer to the discharge processes now so extensively used.

If a strongly acid substance be printed on the prepared goods, the alkali will be neutralized and the

naphthol set free, so when the goods are dyed no color will develop where the acid has acted. Diazo solutions have the defect of staining the whites, consequently it is necessary to use some reducing substance along with the acid to protect them. Stannous chloride, better known under its trade name of tin crystals, is the reducing substance generally employed. Other substances have been tried for discharge work, with more or less success, such as organic acids with some fatty substance to protect the fibre, bisulphites, etc. Tin crystals are by far the most important, on account of their certainty of action and the sharpness of the figures produced. The principal defects of the tin acids are that the whites which they give are never quite pure; a little tin remains on the fibre which can not be washed off, so the white is apt to have a faint tinge of yellow—sometimes more than a tinge; also, if care is not taken, the strongly-acid stannous chloride is apt to act on the fibre and tender the goods.

To illustrate the discharge process, I have printed a tin crystal acid on a piece of beta prepared cloth. There appears to be nothing on the patch, but dip it in the claret developer, wash it a little, and we have white objects on a claret ground.

When it is desired to produce colored discharges, the same acid substances are used, but with the addition of colors that are able to withstand the action of the acid and stannous chloride, and at the same time fix upon the fibre. Such substances are found in the basic anilines. The white and colored discharges may be printed upon the goods either before or after preparing with beta-naphtholate of soda. The result is the same in either case and in practice both methods have been found useful.

Goods printed with white or colored discharges are developed in the same way as plain shades.

Colors which are not affected by the processes of preparation and development, may be used: such for instance as aniline black.

Some metallic salts have a marked action on azo colors, notably copper compounds on para red and dianisidine blue. The former is changed from red to brown, and the later from a bluish violet to a full blue. In the case of dianisidine blue the copper is added to the diazo solution. This is the most important application of copper to azo colors. With para red the coppor may be added to the prepare, to the diazo developer, or the red itself may be changed by boiling in a solution of a copper salt. I mention this principally because it is well to bear this property of para reds in mind, if it is desired to produce the best and brightest shades.

On account of the limited time many practical and interesting points must be omitted. I will therefore conclude by noticing briefly an important use of the diazotisation process, viz: its application to goods previously dyed with certain substantive colors, such, for instance, as Primuline or Diaminogene B. These coloring matters contain an amido group, and consequently may be diazotised and developed. Primuline is an example of a dye that gives several colors according to the nature of the developer. Diaminogene is an example of a color that is made darker and more fast by diazotising and developing. The first step is to dye the goods by any of the usual processes, then treat with nitrous acid and immediately develop, but here the developers are generally of the phenol or naphthol type. Ice is not required as a rule. Some very good blacks may be obtained by diazotising and developing suitable substantive colors They are apt to be somewhat expensive however, since 3 to 5 per cent. of the dyestuff must usually be taken and the baths are not exhausted.

I will add in conclusion that the methods which I have been trying to illustrate from an excellent example of how strictly scientific processes, resulting from patient and laborous research in modern organic chemistry, may be applied to the commercial production of colored textiles. This also emphasizes the fact that no matter how insignificant or devoid of practical importance the results of scientific research may appear to be, no one may therefore safely affirm that at some time they may not acquire great practical importance and so contribute their mite to increasing the sum of human happiness.

Gloss on Cotton and Linen Goods.

Among the very recent processes for obtaining a silk-like gloss effect on fibres and fabrics is one devised by the Farbwerke of Hoechst-a-Main and described in the Textile Manufacturer of Manchester, Eng.

The object of this is to produce durable effects on both cotton and linen stuffs. To do this they employ the modified mercerizing system of Thomas & Prevost, by aplying appropriate resisting styles capable of neutralizing the mercerizing effect of soda lye upon the fabric in the state of tension. By these means they claim to obtain a new, valuable, and technical effect. It is known that it has been impossible hitherto to produce damask-like gloss effects of perfect durability by means of the dyeing or printing processes. The methods employed up till now were, as a rule, limited to printing with oxide of zinc, barium sulphate, etc., combined with a fixing agent (albumen, caseine, etc.), on tissues of sateen-like weaving and gloss dressing in order to thus neutralize the sateen gloss, and of the tissue by means of this locally fixed white color. While the gloss produced by this sateen weaving cannot be compared with real silk gloss and with that obtained on cotton by Thomas and Prevost's system, and must be regarded merely as an effect of weaving and a particular method of dressing, it is to be observed that the silk gloss of mercerized cotton in a state of tension is obtained by a chemical and physical change of the cotton fibre.

It is a fact that the mercerizing of the cotton in a state of tension causes the lumen of the fibre to shrink, to become transparent, and to undergo great changes on its surface which produce this lasting silk-like gloss. Also from a chemical point of view the fibre undergoes an advantageous change, and it is generally known that since Mercer's experiments the affinity of cotton fibre towards mordants and dyestuffs is considerably increased by the influence of strong soda lyes and agents acting in a similar manner (concentrated SO_4H_2 solution of chloride of zinc). It is, therefore, possible to produce this mercerizing effect on fabrics locally, under conditions as specified by Thomas and Prevost (tension), either by means of printing with concentrated soda lye or by protection of the fibre against the mercerizing effect of the soda lye, a durable and damask-like effect being thus obtained. The substances suitable for the resisting style are easily coagulable organic bodies, such as albumen, caseine, etc., as well as salts, acids, or oxides, which partly have a neutralizing effect, or provide the fibre with a protecting film of an oxide.

The resisting action of these bodies against soda lye is not new. With the help of these bodies the most varied white and colored gimping effects were obtained, while the object of the present process is to avoid the shrinking of the tissue and the silk gloss thus caused.

In the description of a German patent, particular stress is laid upon the circumstance that the printed resisting style—albumen, caseine, etc., or mixtures of gum with acetates of aluminium or chromium—becomes insoluble by previously steaming, and thus forms an inseparable compound with the fibre. In order to obtain the intended effect, the applied resisting styles need not be steamed, and the possibility thus created of effecting a subsequent removal of the albumen, or the encrusting protecting substances, is in many cases a great advantage. As the silk-like gloss produced on the tissues in form of patterns, according to this method, is very durable, such cloths may be afterwards dyed, printed, steamed and washed without danger to the gloss. It is likewise possible to produce the most varied printing effects with durable silk gloss by the addition of mordants or dyestuffs to the resisting styles or to the mercerizing soda lye. The printing of the resisting styles and the mercerizing, may be done separately or in succession on the printing machine; in the latter case the printed cloth on leaving the roller is stretched by means of an appropriate stretching apparatus. The wash-

ing in a stretched condition is continued until the tension of the inner fibre has ceased.

The following is an example of an appropriate printing color:

Mercerizing color for direct printing 70 grms. British gum and 930 grms. soda lye (40 Be), or 100 grms. wheat starch, 200 grms. water, and 2,000 grms. soda lye (40 Be).

Resisting color—Albumen solution 10.0, 700 grms.; and dilute solution of gum tragacanth 300 grms.

We might add further that the microscopical appearance of cotton mercerized by the process of Thomas & Prevost differs from that of ordinary cotton in a striking and typical manner. The mercerized fibres mounted in water generally appear stretched and smooth, only showing the twisted appearance in places, or not at all. Those fibres which possess the well-known twisted appearance, have a large lumen and are little changed. The fibres from the outside portion of the yarn show, in consequence of the greater tension, longitudinal folds, while those from the inside frequently show transverse crushed folds.

The surface of the fibres often shows an intermittent double stripe. The cuticular layer is generally completely demolished. The lumen of the fibres in places is greatly enlarged; in others it appears as a dark line, while in others it has entirely vanished. The enlarged portions of the lumen are frequently filled with a granular mass. In polarized light the fibres behave just like ordinary cotton.

Sheep Husbandry in Syria.

THOMAS S. DOYLE, BEIRUT, SYRIA.

Up to the close of the year, 1896, this district included within its boundaries the vilayets of Beirut, of Syria proper, of Aleppo and Adana, together with the great mutessarifate of Mount Lebanon. The establishment of the new consulate at Alexandritta removed from its territory the two vilagets of Aleppo and Adana, thus cutting off the great sheep-raising districts lying around Aleppo and on toward Erzeroum. Still, a comparatively large number are raised within its boundaries.

According to the latest statistics, or, rather, estimates, for what we consider statistics are not to be had in this country, that are available, the total number of sheep raised in the vilaget of Beirut and the Lebanon mutessarifate is in the neighborhood of six hundred thousand (600,000), while from two to three hundred thousand head are annually imported from the vilagets of Erzeroum and Mossoul for slaughtering purposes. In the vilaget of Syria, of which Damascus is the capital, it is estimated that there are something over one million sheep.

For the year ending June 30, 1896, 2,739,650 pounds of wool were exported through the port of Beirut. Of this, 608,487 pounds went to the United States. For the year ending June 30, 1897, 2,335,740 pounds were exported, of which the United States took 838,564 pounds.

Besides these reports, a considerable amount of the wool grown in Syria is used by the natives in various ways, as stuffing for mattresses, comforts, saddles, cushions, divans, etc., in the manufacture of carpets, coarse cloths, hosiery, etc. In these manufactures no machinery save the old fashioned hand loom and spinning wheel is used.

There are but two varieties of sheep in the whole of Syria, viz: the "Awassy" and the "Moor" sheep. The wool of the first named, whether white or black, is of long and nearly straight staple, while that of the last named is reddish brown in color and very curly.

The "Moor" sheep is generally kept for domestic use, especially in Mount Lebanon district, where they are fattened and killed for winter use. Every family, no matter how poor, seems to own at least one of these sheep, which is literally stuffed all through the summer and fall so as to be as fat as possible. At the beginning of the colder weather the sheep is killed and the flesh cut up into small pieces and cooked. The cooked meat is then packed into earthen jars, the suet is melted and poured over it, and the jars stored away. During the winter

this meat and suet is taken out of the jars in small quantities for daily use, forming the animal food of the owner.

Flocks of sheep range in number from 25 to 1,000 heads each. In the large flocks there is a shepherd to every 80 or 100 sheep. Their wages range from 17 to 25 cents per diem. In the Beirut vilayet and in Mount Lebanon, the sheep are housed at night in the winter months. In other districts they stay afield day and night, the shepherd sleeping out with the flock. The average weight of the washed fleece is from 3 to 7 pounds, the price per pound about 7 cents. The shearing and washing are done in May.

It is hard to tell why no effort has ever been made to improve the breeds of sheep here by the introduction of foreign blood. The true reason is, probably, to be found in the intensely conservative character of the people, especially in the rural districts. They are, as a rule, entirely contented with everything just as it has been handed down to them by their fathers.

In appearance, the Syrian sheep resembles the ordinary breeds in the United States, except in two particulars, viz., the Syrian animal has a rather long, flop ear, and an enormous tail. Their tails weigh anywhere from 4 to 15 pounds and strike the unaccustomed eye as being not only ungraceful but cumbersome. Some of the sheep that are stuffed for winter use have such tremendous tails by the time the fattening process is completed, that they can with difficulty get up from the ground to walk.

Carpet Making in Japan.

A Japanese industry which employs a large number of hands, and chiefly children, is carpet making. In Japan the carpet is a modern luxury. Before the days of foreign trade, cotton carpets with a long pile an inch in length, in imitation of the Chinese article, were made in small quantities, and when, after the signing of the foreign treaties, European goods began to be introduced, carpets greatly took the Japanese fancy. Byron Brenan, in a recent report to the British Foreign-office, says that the carpet makers of Sakai, the chief seat of the industry, situated about six miles from Osaka, took hints from the foreign articles, and in course of time improved so much upon their earlier processes, that in 1878 cotton and jute carpets began to be exported to Europe and America. The trade has now grown to large proportions, and it affords one instance of the Japanese being able to beat those from whom they learnt. Carpet making affords a striking example of the successful competition between cheap labor and machinery. At Sakai there is no large factory; the hand-looms are distributed all over the town, and the carpet dealers supply the material and pay the workers by the piece.

In each house there may be three or four looms, ranging from 3 to 24 feet wide. To each loom there are from two to four children, with a grown-up person superintending the work. With incredible speed the children, some of them as young as seven, pass the yarn in and out of the warp and snip off the right length with a pair of spring clippers. They are all kneeling at their work on a plank laid at the foot of a loom, and they slide backwards and forwards along their allotted share of the design. As their little fingers pass the yarn in and out of the cotton threads, these small children sing in a sort of nursery rhyme which helps them to remember the pattern, and at intervals the woman in charge leads off a new verse, which the children at once take up, and simultaneously effect the change suggested by the new music and the words. They work, or at least are at their work, for twelve hours a day, and their wages come to about two cents a day. The price of a rug made of cotton or hemp depends upon the number of threads in warp and woof; about 250 threads to a yard is the average quality.

Woolen carpets are being manufactured, but in price they seem far to exceed similar carpets made in North China without a corresponding im-

provement in quality. Australian wool is used, which of course is much dearer than the Mongolian wool. Small silk carpets are also being made, but the demand for these is limited; they cost as much as $5 per square foot; for a carpet of any given dimension 90 times the labor is required as in the case of a hempen carpet. Three hands will make an ordinary hemp or wool rug, 3 by 6 ft., in one day, and it would take the same workers three months to make the silk carpet. The number of carpet-weaving establishments in the district of Osaka is nearly 2,000, producing 3,000,000 square yards of carpets in the year, and in them are employed 5,000 male and 13,000 female workers.

Fuller's Earth.

Since the discovery of Fuller's earth in Florida about two years ago, the knowledge of its occurence in the United States has spread rapidly, with the result that persons all over the country have been searching for it, but often without success.

As Fuller's earth resembles common clay in its appearance, the only way of identifying it with certainty is by means of a practical test of its bleaching or clarifying effect on oils. This, however, requires some practice, especially in the case of cotton seed oil. The color of the earth is no guide, as it varies greatly, nor is an analysis of great value except as indicating the fact that Fuller's earth has generally a high percentage of combined water and rarely over 15 per cent. of alumina. Fuller's earth when dry adheres strongly to the tongue on account of its absorbent properties, but many ordinary clays do the same.

During the past year, Fuller's earth has been reported from Colorado, South Dakota, Nebraska, New Mexico, Indian Territory and New York, in addition to the occurences in Georgia, Florida and North Carolina.

The Fuller's earth beds in South Dakota are the most extensive thus far opened up in the West. Some of the beds found in Nebraska are stated to be 30 feet thick and several miles in extent.

The Fuller's earth found in Colorado is a fine-grained, greenish-gray clay, with soapy feel. The bed is about 30 feet thick, and under-lies a bed of red sandstone. It rests on the granite. Its original use was as a filler for paper, having been so used at Denver, but more recently it has been put on the market as Fuller's earth. One of the lard companies in Denver has been using it, but it was not found wholly satisfactory. Its lack of bleaching properties may be due to the fact that it was not ground sufficiently fine.

Twelve miles north of Rome, N. Y., is a deposit of Fuller's earth which has been worked for several years. The material is fine-grained, and dense. The total thickness exposed is about 15 feet, and there is a capping of 4 feet of sand. Thus far this Fuller's earth has been used only for cleansing woolen goods. It is shipped to several factories in New York and neighboring States.

Production in Florida in 1896 was limited to the neighborhood of Quincy, Gadsden County. It is evident that many deposits, not yet opened, and the size of which have not been determined, exist in various parts of this county, and particularly exposed in the river banks at River Junction, Florida.

The additions to the known localities of Fuller's earth in Florida made during 1896, are principally in the neighborhood of Tampa.

Scotch Tweeds.

United States Consul Rufus Fleming, at Edinburg, Scotland, writes to the State Department, that there is extreme depression in the tweed trade of that country. For several months, the tweed industry in Galashiels and Hawick has been practically lifeless. To some extent, this condition is due to foreign tariffs, but the tweed manufacturers are forced to admit that the competition of Yorkshire goods has severely affected their trade. This competition of the Yorkshire worsteds and Scotch tweeds for the home and

colonial markets has been about as keen as any contest that is recorded in the industrial and commercial history of the United Kingdom. The result is a victory or an advantage, temporary though it may prove, for the Yorkshire manufacturers of worsteds.

The medium and lower grades of Yorkshire goods are somewhat lower in price than the corresponding grades of Scotch goods, owing, it seems, to the better utilization of labor and machinery in Yorkshire, where one operative attends to two looms, whereas in Galashiels and Hawick, one operative has charge of only one loom. But the opinion of dealers in both kinds of goods is that the Scotch article has lost favor and the Yorkshire gained favor, chiefly because the latter is more dressy in appearance than the former; in a word, that it is a matter of afshion, the public taste having changed.

Manufacturers of tweeds profess to be confident that the preference for the smoother worsteds is a passing whim, and that the Scotch goods will, in the course of a few months, again be largely in demand.

Lustrous Effects On Yarns.

Improvements are being made in the methods for producing silky or similar lustrous effects on yarns, threads and fabrics, having a vegetable origin. These improvements are noted in the manufacture of domestic, as well as foreign yarns. There are several cotton mills in this country that are now producing yarns, etc., of this character. Each mill has its own process, which it holds as a secret, though it may be one in common use. New processes, however, are constantly coming forward and patented. The same methods, practically, are employed in producing lustrous effects on yarns, threads and woven fabrics, the difference being chiefly in the machines or appliances that are employed.

We note in our foreign Continental exchanges, frequent allusions to processes for this purpose, several of which have attracted our attention. One is described to the effect that after the yarns have been mercerised the superfluous mercerising liquid may be removed by squeezing between rollers, and whilst still wet with the mercerising liquid the yarns can be stretched to such an extent as may be desired. It is suffered to remain in the stretched condition for from five to ten minutes, and is then douched or otherwise thoroughly washed with water and released from the stretched condition. For the best result, however, the following is recommended:

The yarns are mounted and moderately stretched upon two rollers capable of being moved apart and of being rotated. These rollers are mounted vertically one above the other, one in and one over a bath in which the mercerising solution is placed, so that it covers say about one-third of the yarn. The rollers are rotated, and after the yarn is saturated with the mercising liquid, the rollers are moved away from each other so as to stretch the yarn to whatever length is desired. The yarn, whilst still in the stretched condition, is then washed with water introduced into the bath in place of the mercerising solution, and the washing is continued until the soda is removed. The yarn is then taken from the rollers, and will have a lustrous or silky appearance. This is the case only when Egyptian or Sea Island cotton has been so treated, and other fibrous materials are therefore excluded.

The process of imparting luster to yarns is not confined altogether to the vegetable, but may be used for animal textile materials. A method for yarns of animal fiber is described as follows: The materials are treated for half-an hour at 86 to 95° F., with a solution of 5 to 7½ per cent. of their weight of bromine in water. After being washed in water, they are passed first through a soap bath, and then through an acid bath. Bromine has the advantage over chlorine that it does not show any tendency to turn the material yellow, so that it will afterwards take the most delicate colors; besides, in mixtures of dyed and undyed wool,

the former is not attacked. Though the application of bromine has much less tendency to yellow the wool, the gloss obtained with it is not by any means so fine as that obtained with chlorine.

A process for giving a silky gloss to cotton yarns and fabrics, and described as something new has been used with the following results, after a number of trials. The tensile strength of the cotton yarn that was tested was ascertained before treatment, then after mercerising, and then after mercerising in a stretched condition. It was found that a bundle of five threads of two-fold 40s cotton yarn would break with a weight of 1.440 grms (mean of the estimations). After mercerising in the ordinary way the same cotton showed a breaking strain of 2,420 grms., and after mercerising in a stretched condition one of 1,950 grms. Its strength had thus increased 68 per cent. in the former case and 35 per cent. in the latter. Before breaking, the threads stretch to a certain extent; while those of ordinary cotton stretched from 50 to 55.5cm., those mercerised in the ordinary way stretched from 50 to 58.5cm., and those mercerised under tension showed the same stretch as ordinary cotton. In dyeing with direct cotton colors the three samples behave differently. Those mercerised in the ordinary way, dye a deeper shade than ordinary yarn, or yarn mercerised under tension, while again that mercerised under tension takes a little more color than ordinary yarn, but here the difference is not so great as might have been expected.

Viewed under the microscope, the cotton mercerised under tension appears considerably more transparent and more rounded than that mercerised without tension. The former has besides a smaller diameter.

Fabrics consisting of silk warp and cotton weft are sprayed while stretched on machines similar in construction to stretching on tentering machines with caustic soda. As soon as the latter has acted sufficiently and the fabric has assumed a parchment-like appearance, water is showered over the fabric until the lateral strain ceases. The pieces are then taken off the frames and washed in a bath containing dilute acetic acid, in order to neutralize the remaining alkali. For cotton velvets and other fabrics in which a mercerisation under tension is not possible in the piece this process is effected in the yarn before weaving. All-cotton fabrics may also be mercerised in a similar way on iron frames, care being taken to keep both warp and weft stretched during the process. Besides acquiring a permanent gloss, the fabrics thus treated have acquired additional strength.

An Old Woolen Factory.

There appeared quite recently an interesting article in the Gazette, Port Jarvis, N. Y., from its correspondent at Milford, Pa., in relation to an old woolen factory, as the remains of an industry that existed in Pike County, Pa., eighty years ago. The factory building is now in ruins and overgrown with moss lichens. We reproduce the article as follows, as worthy of more preservation than would be accorded to it in a weekly newspaper:

Early in the teens of the present century, Joseph Brooks, a native Englishman, drifted from Philadelphia into northeastern Pennsylvania, and for reasons unknown to any but himself, conceived the idea of building and operating a woolen mill in that portion of the State that is now within the borders of Pike county. With that object in view he purchased from the John Gustins three hundred and twenty-seven acres of land known on the commissioners books and official map of the county as John Van Campen lot number twenty-three, in what is now Delaware township, and received title by a deed bearing date July 26, 1820.

The land was located on Dingman's Creek about five miles from the Delaware river and in its boundaries included three picturesque falls formerly called the Deer Leap Falls, more recently known as Factory Falls, at a point where a fine water power was available and which was subsequently utilized for driving the machinery of the factory.

In 1822, Isaac Shaffer (the father of the present driver of the stage between Milford and Dingman's Ferry), as boss mason, laid the corner stone of a stone building forty-five by sixty-five feet in dimension, and two stories in height, over a basement of the same size.

Later Mr. Brooks associated with himself Bullock and Davis, dealers in woolens and satinets, in Philadelphia, and commencing with eighty operatives, chiefly people of his mother country and experts in the business, to manufacture woolen blankets and satinets for the markets of that city. In those days, as at present, no wool of any moment was obtainable in that portion of the State, and all supplies of raw material were of necessity carted by teams and wagons from the markets of Philadelphia, a distance of about one hundred and twenty miles. All manufactured products were also carted to that market, and nearly two weeks were necessary for the round trip.

The expenses for raw material and delivery of the finished products was so great that the Philadelphia parties in the enterprise soon withdrew, and Joseph Brooks again became the sole owner of the property and plant. He continued the business on a very limited scale until his death late in the 30's which occurred very suddenly in Milford while singing a song called "Dull Care" on the porch of a hotel in that village. His widow lived to be over one hundred years old, and died near the scenes of her husband's blighted hopes and ambitions.

After years of changing ownership, a portion of the estate, comprising fifty-two acres, including the ancient and abandoned old factory building, the falls and neat grove on the plateau just above, was purchased, in 1892, by the late George W. Childs, of Philadelphia, and has since been known as "Child's Park."

The walls of the "old factory" stand intact, overgrown with moss lichens, the roof collapsed by the weight of the snows of its many winters, but still an ancient and lasting monument to the crushed ambition, ruined business and sunken fortune of its founder.

French Textiles.

During 1897, the mills of Roubaix and Tourcoing, France, turned out a diminished production, not more than one-half the looms at times having been at work. However, certain goods have been less affected by the depression. Fancy goods are most in favor and have contributed largely toward keeping up the working force of the mills. Manufacturers have produced very pretty effects in stripes and plaids in pure wool goods and in a mixture of wool and cotton. Silk threads, also, have been used with good effect. Imitations of draperies have found a good sale, but the success of the season is goods of small pattern on a fancy ground of pinpoint design, known as epingle. Scotch plaids of fancy design have again come into favor. The old-time cashmere has been superseded by diagonals, basket weaves, and granites. Small patterns are more in favor than large, and the preference is for darker colors than have been worn. Crepons, both plain and fancy, have fallen into disuse. The mixture of metal thread in vogue last year was not found satisfactory, owing to the tarnishing effect of the atmosphere.

Manufacturers have endeavored to produce foules at so low a price that the poor quality has thrown discredit on this article, which should be kept up to the mark on account of its excellence for every-day use. There has been little demand for cotton tennis cloth or for the so-called Russian flannel, an excellent imitation of Rheims goods. Woolen goods are made in small patterns and in bright colors or silk on a dull ground. This material, intended for walking costumes, has created quite a demand. Amazon cloth is made principally in fawn color, in deep purple, and deep blue. Serges and diagonals are less in fashion than during former years. Cloth for men's wear has not had a good sale. Cheviots have given place to

finer goods in so-called marengo shades.

Upholstery goods may be mentioned as a branch of local industry that has suffered the least. Manufacturers have produced marvelous effects in cotton upholstery goods that resemble silk so closely that it is difficult to distinguish the difference. Threads of metal can be used in this class of goods and produce the most brilliant results.

The comparative non-success of the year 1897 inspires the French manufacturer with the determination to place goods of such excellent quality on the market that the present year shall retrieve his losses.

Cotton Market.

The price of middling cotton at the present writing is 6¼ cents for middling uplands, against 5 5-16 cents last month. This advance in the raw material has improved the goods market; still, the market is one of dullness, with little to characterize it from that which has been existing for the last number of months. It is a waiting period, with nothing doing to warrant any speculation in the staple, whatever. The chief factor is the probable acreage for 1898. The feeling is becoming more and more pronounced that there will be but a slight, if any, decrease in the acreage, which would mean another large crop and lower prices than have yet been seen. It also confirms a belief that the cost of growing cotton is not as high as many have figured it, and that its growth at present prices is profitable to the planter. The recent advance in the price of cotton has had the effect of encouraging planters to cultivate the same area as last year. In this respect, the advance has been an unfortunate one, occurring at this particular time of the season. Notwithstanding the apparent disposition on the part of planters to cultivate as much cotton as is possible, we think that six cents a pound is as low as the cost of growing cotton can be figured. All of the advices from the Mississippi Valley and Texas indicate little liability of any reduction in acreage, and plantations are reported as rented and sold at better prices than for many years, because the large yield per acre last season more than compensated for the low price received for the staple. Up to the present writing, 9,500,000 bales, in round numbers, have come into sight, which would seem to indicate a crop of close on to eleven million bales. The amount of cotton that has been taken by spinners, both North and South, has been larger, thus far, this season, than for the same time last season, exceeding the latter period by nearly 500,000 bales. The greatest increase in the takings is on the part of the Northern spinners.

Wool Market.

The wool market is in a quiet mood. In fact, it may be denominated extremely dull, and there are no interesting features to report. As yet, however, there is no apparent weakness in prices, but a general steadiness exists, with a faith on the part of holders of the staple in the stability of prices till the wool is really wanted. The foreign market is firm, with no signs of giving way. It has a strengthening effect upon our domestic market. Fine wools are looked upon as being especially good property, at present prices. Manufacturers are doing well, many of them having orders to run far into the year. The prices on goods have not advanced to a parity with the advance in the price of the raw material; still, they are sufficient to give manufacturers a fair margin for a profit. Ohio XX and above cannot be bought for less than 30 cents a pound, unless the condition is somewhat off. Unfavorable reports come from the West regarding the sheep husbandry in that section, due to losses through bad weather. Fine merino wools, in the world's markets, are getting to be scarce. It is thought that an unusual amount of shoddy and low stock will be used this season, in the manufacture of heavy weight goods. It seems to be pretty well settled that shoddy

will be introduced into wool manufactures wherever it is possible to put it, and especially will this be the case if cassimeres are more freely made than heretofore, as is anticipated.

Legitimate Use of Shoddy.

A Boston writer to a New York contemporary defends the use of shoddy in clothing, which seems to be a never ceasing theme for antagonism by many who in reality know but little of the subject upon which they discourse.

He writes with much truth that there are many goods which can be made of shoddy as well as of new wool; for instance, those which are worn only as long as they are in the prevailing style, and then are laid or thrown aside long before they are soiled, much less worn out. These include articles for children's wear, which are so soon outgrown, not worn out, and a numberless list of articles where new wool would be as unwelcome as unnecessary, and where hard wear is not needed or expected.

As a rule manufacturers do not pretend to make these articles of the good, new wool, for at present prices in goods of this sort it is impossible to do so. These same manufacturers know of and have felt the demand from the great mass of people for the goods which are part shoddy; and it is in order to satisfy the buyer, not to fleece him, that shoddy goods are on the market to-day.

Just as long as dealers sell shoddy goods at comparatively low prices and people buy them in distinct preference to the "all wool" goods at higher prices, the cry of "fraud" and the attempts at law-making are useless.

But this view of the case must not be interpreted to mean approval of the manufacturer or dealer who represents such goods as all "new" wool, and sells it at a correspondingly high figure. For such a man the cry of fraud is not misplaced.

The hubbub raised should not be against shoddy, simply because it is shoddy, but because it is sold for new wool. It should also be borne in mind that shoddy is wool and all wool, but not new wool. It has been used before, or at least it has been manufactured before, and is really a refuse which by hard work and able machinery has been reclaimed and once more is put upon the market in salable and useful form.

An Appreciative Subscriber.

Editor Textile World:

I consider that I get many dollars' worth of valuable information from the Textile World every year. No mill man who wishes to keep up with the times can afford to be without it. The paper by Edward W. Thomas is worth the subscription price. Find check for $2.00, for my subscription for 1898 enclosed.

T. J. NELLIGAN,

Pittsfield, Mass.

—It is not generally understood that Japan is beginning to figure as a producer of cotton sewing thread. The buildings of the Japan Sewing Cotton Manufacturing Company, at Yao, Kawachi province, have, however, been completed and formally opened. Japan's annual import of sewing cotton is roughly estimated at 72,000 gross of reels and there have been no factories for manufacturing it until the present company became established, which, however, had been conducted on a small scale hitherto. The company is said by a correspondent of the "British Trade Journal" to be well equipped to meet the home demand and to export a part of the output.

—One important matter which has to be learned in textile manufacturing is the acquirement of pattern or design by economic means. Generally speaking, it would not be an insuperable task to obtain novelties in the loom if the cost of production were a factor of secondary importance.

—Carpet yarns when they are received from the spinners still retain the oils which have been added during the spinning operations; and in this state they are technically known as "in the grease."

COTTON DEPARTMENT.

Leno Weaving.

Continuing from your issue of January, we now come to the plain, pure gauze and fancy gauze weaves. Fig. 3 illustrates a pure, plain gauze; the pattern repeats after two picks, viz., a doup and a crossing pick. This weave being a pure gauze the doup thread is never left down for the filling to pass over it, but is always up at every

Fig. 3

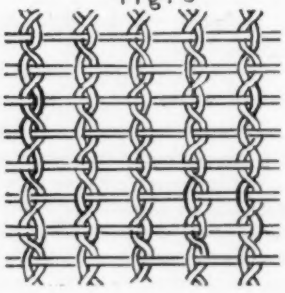
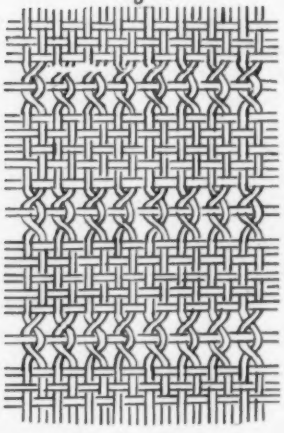


Fig. 4



pick, it being lifted to the right by the back harness, and then to the left for the crossing pick by the standard harness.

Fig. 4 illustrates a leno, the gauze effect being produced by three picks, viz., a doup, a crossing and a doup pick. This weave is very common and is invariably used instead of the effect shown at Fig. 1, in your issue of January. This weave is used on account of there being but one crossing pick to the pattern, and is an advantage, as explained in previous articles.

We have previously stated that all leno weaves were woven wrong side up, or face down, but take patterns shown at Figs. 3 and 4, I should be safe in saying that it would be impossible to distinguish any difference one

Fig. 5

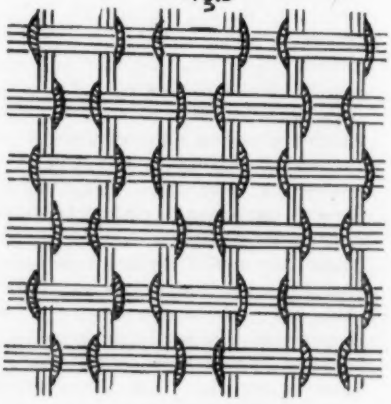
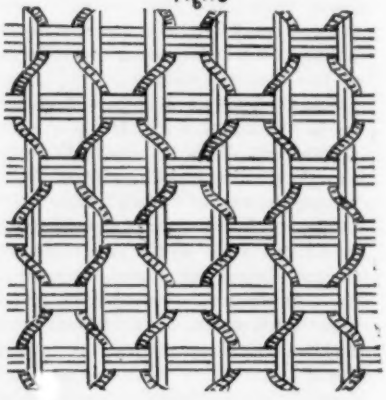


Fig. 6



side from the other. This is on account of the crossing and doup threads coming from one and the same beam, and of course both threads being at an equal tension, each thread

must bend a like amount and both sides will look alike. But when the doup thread is on a separate beam, there will be a right and wrong side to the cloth. This point must not be lost sight of when (for instance) drafting a leno in combination with a satin stripe, for if it is we may be weaving the leno part face down and the satin stripe face up, and the effect would be anything but pleasing.

Fig. 5 illustrates a pure fancy gauze with six picks for repeat of pattern, 3 doup and 3 crossing picks, also 2 crossing threads and a cord for doup thread. This weave is shown as it is woven, wrong side up or face down.

Fig. 7

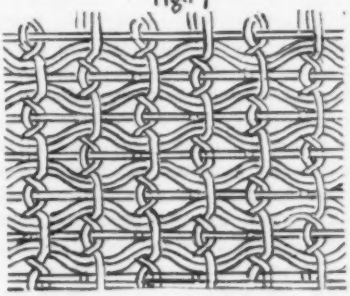
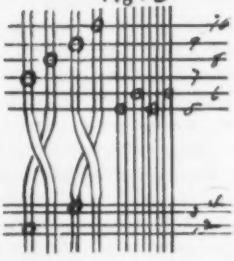


Fig. 8



The doup thread being a two or more ply cord, is run on a separate beam, and being run with a much looser tension than the crossing threads, will have to do all the bending as they pass from side to side, and the crossing threads will retain (nearly) their straight position.

As we examine this pattern, we find there is something about it that gives the impression that all is not right, and still the cords seem to show as much on one side as the other, but you will notice that the cords seem to be, and are, continually pulling the picks of filling to the under side, and so leaves the upper side bare and smooth.

Fig. 6 illustrates this same pattern, but as it would appear right side up. You will now notice that the cords seem to be holding the crossing threads down, and the picks of filling up, so that we can readily see that this must be the right side of the cloth. This weave gives a very pretty effect when woven as a stripe in combination with other weaves..

Fig. 7 illustrates a leno weave commonly known as the "Bird's eye." For this weave we require two sets of doup harnesses. This weave is also a pure gauze, for each doup thread is held up for 5 doup picks and one crossing pick, with 6 picks for repeat of pattern.

The drawing draft is shown at Fig. 8. It will take ten harness shafts, with two extra jacks of the dobby to work the slackeners. Harnesses 1, 2, are for front doup; 3, 4, back doup; 5, 6, selvage harness, 7 crossing, and 8 under 7 and through front doup; 9 crossing, and 10 under 9 and through back doup. Both sides of this pattern will also have the same appearance, and if woven in combination with a satin stripe, the stripe need not be woven face down. DOUP.

(To be continued.)

(*Especially for the Textile World.*)

Textile Designing.

Lecture by V. I. Cumnock, agent of the Boott Mills, before the Lowell Textile School, Lowell, Mass.

(Concluded from February.)

The staple market is one of the hardest for which to make patterns. The competition, to start with, is intense and the different weaves have been so thoroughly used that new combinations are very rare, one has to rely almost entirely on the producing power of his design for its existence. He may be called upon to run a silk stripe into a sateen or to put woolen filling into a cotton warp, then, his well grounded knowledge of the methods employed, to properly handle these foreign yarns, will stand him in good stead.

Adaptation and ingenuity must play an important part in his career, and taken together with a lot of good temper will without doubt round out a good cotton designer.

Let us now look at some of the tools with which the designer of to-day has to work. Starting with the loom which has not been changed much in the last ten or fifteen years; it has, nevertheless, the best points of foreign looms, combining with characteristic American skill, lightness of construction with proper strength of parts which insure great speed. Within the last two years, it has been my privilege to twice visit some English weaving mills and I do not think we need have the slightest fear that the English loom will ever surpass the American.

One of the most striking sights in a foreign weave shed is the shutters which are placed at the ends of every loom to stop the shuttle when it flies out of the shade. So elaborate are the preparations to stop the shuttles that one can but wonder why all English looms are built with the binder on the back instead of, as in the best of our looms, on the front. There can be no good excuse for changing the direction of a shuttle when it is once started, nor why the line of its flight should have two humps.

Our looms have a straight shuttle flight from the fact that the back of the shuttle-boxes and reed are in line, and always stay so; and, therefore, it is only where some knot or the like does not allow the shed to open that our shuttles leave the shed.

I have also had the pleasure of running a loom for a few minutes in a little weave shop in Cairo, Egypt. While riding through a street so narrow that the wheels nearly touched the houses on either side, I saw in a small house the most primitive style of weaving possible. The loom was constructed thus: over a hole about two feet in diameter and as deep, dug in the ground, a square frame rested, on one end of the frame was a simple take-up roll which was operated by hand; wooden pegs to keep it from unwinding, were driven in at anything but regular intervals and a big stone rested on them. From two uprights and a cross piece was swung a lathe in which was a home-made reed with dents of several different sizes. There were no shuttle boxes; in fact, a ball of yarn was pushed through the shade. The harnesses were also home made of unvarnished string more than double knotted. They were hung over the cross piece and from the under side two loops were fitted. Now sitting on the edge with the feet in the hole, a foot in each harness loop, you could raise and lower the harnesses at will. There were bright colored stripes of red, green and yellow, mixed with true oriental skill, and the warp stretched from the take-up, back through the reed to the harness. After passing the harness and over a set of lease rods, the whole warp went through a wooden ring in the ceiling and a beautiful friction was obtained by hanging a rock on the end. I could not resist the temptation to get in the hole and after a little persuasion the weaver let me try my hands and feet. He was a little surprised that I could operate his loom even to lifting the stone and taking the slack out of the warp. I soon gave him his place and about five days pay, for I found afterwards that he could weave about five yards a day and got a nickel for his pains.

In the loom itself therefore, we have no fear of competition. The Jacquard head of Worcester or Philadelphia make, both single and double lift, for all kinds of weaving, from the carpet to the silk leno, are without doubt the finest in the world. Their construction and finish is greatly to the credit of the inventive skill of the great loom builders of this country. In all that pertains to the preparation of the design for this class of weaving, great care has been taken to make labor saving machinery of great accuracy. Our drop-boxes also give us the advantage of our foreign competitors for they also show the same skill and accuracy as well as the high speed for which they are specially noted. In fact the gingham of today can be

woven on a modern loom at a very slight advance over the plain cloth of equal pick.

In the Dobby head, we come more closely together, for there are certain English makes which are equal if not superior to ours. There is no great advantage, however, in this machine till we come to leno weaving; then the American open shed Dobby with the proper leno attachment has no equal, still to get the best results, we do use in this class of weaving imported doup yarn.

It will thus be seen that we have the advantage of England, France and Germany in the loom and its various attachments for fancy weaving; for France and Germany run English-made looms almost entirely. There are no large loom works in France and almost none in Germany.

Therefore, with these advantages, the textile designer should be able to place on the market, goods of a character equal to the foreign, and there is no reason to doubt that when the domestic market recognizes the value of original fabrics which are made in this country and calls for them, that they will be forth-coming.

It will devolve upon the younger designer who, having made a thorough study of all the different classes of designing with an intimate knowledge of all the different kinds of fibre, combined into yarn, working with a similarly educated man in the market, to start a real desire for domestic design.

The combination of these two men, educated for the purpose, will do much to take some of the looms off the plain cloths with which the market seems at present to be flooded.

It would be interesting, had we the time, to take some of the cloths which were made fifteen or twenty years ago on a Crompton tappet, and compare them both as to style and cost, with the nainsook of today rattled off of a fancy loom, running at the rate of 185 picks per minute.

The textile designer has kept pace with the speed of the loom, and he now does his work with a great skill and puts into the cheapest nainsook quite as good a quality of work as was formerly put into the brocade.

Some of the dainty lenos of the finer mills either in the bleached state or when covered with the beautiful work of the print designer are certainly works of art.

Also the silks made in this country are worthy the attention of the artist, for they are finely constructed and exceedingly well colored. When mixed with imported goods on the retail counter, it is impossible for even an expert to distinguish between the foreign and domestic article.

This has been a slow growth but nevertheless a sure one, and reflects great credit both on the manufacturer and the designer who have worked out the vexing problems many times, with little or no authority to which to turn for proof and support of their theory.

There is one great help to the designer in any mill, and that is the knowledge which the overseers in all of the departments throughout the mill have of designing. The overseer of weaving certainly should have a clear idea of all pertaining to a pattern before starting to weave it; the best results can only thus be obtained. The dresser who handles the drafts and makes the warps should also have a good knowledge. The spinner and carder can do more intelligent work when they know how the yarn is to be combined.

I have in mind a mill where there are four overseers who have worked with their heads so closely together that mistakes were almost impossible and the results of their combined efforts are shown in the great success of the mill.

The textile designer of today needs this co-operation very much and as it is greatly through his efforts that the looms are kept going, and therefore the rest of the mill busy, it should be freely given. He is also important to the general buying public for to them he offers his wares be they good or bad. The citizens have realized this, and it is through their generosity he is enabled to obtain his education in this very successful school.

Yarn Topics.

BY W. I. HANNAN.

Corresponding member of The Manchester Microscopal Society, England.

ARTICLE II.

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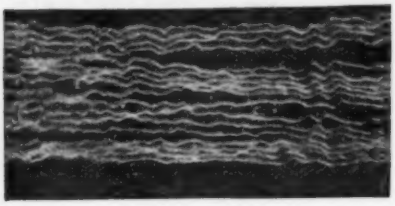
The comparison and origin of yarns from the various kingdoms of the universe, are worthy of every consideration, from those who take an interest in textile education. As typical of the three kingdoms it may be said we have the woolen, silk and mohair yarns from the animal kingdom, the



asbestos yarns from the mineral kingdom, and a host of others such as cotton, flax, hemp, and china grass yarns from the vegetable kingdom.

At times both cotton and wool are incorporated to make a yarn, and when such is the case it may be spoken of as a composite yarn, and in the same way when yarns from more than one kingdom are utilized to make a fabric, such as alpaca and mohair, or a cotton warp with a silk face, they may be conveniently named as composite fabrics; on the other hand, where yarns from only one kingdom are scrupulously used to fabricate a certain cloth, or where only silk, flax or cotton is used, it would be a good guide if they could be known in the trade as entire cloths.

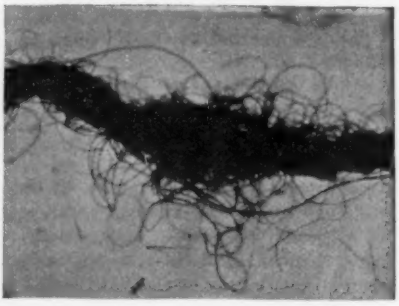
If commerce is the science of exchange, so also are yarns the materials which govern the commercial transactions before the yarns are made into cloth.

In the textile war, or fight for life, that is going on between the producers of yarn and cloth in different countries, it would be all for the better in the end, if the entirety of yarns or of cloths were freely stated. Undoubtedly the competition is keen, but not too keen but that it would allow a decent and accurate nomenclature of the composition of textile yarns.

Strictly speaking, woolen yarns should be made up of wool fibres only, or if any departure is made in its composition, it ought to be so stated at the time the yarn is offered for sale, and this is sometimes done, but perhaps more often neglected, and in the latter case it creates a certain amount of distrust, which sometimes ends in the order being revoked, and a severance of friendship and good will amongst active firms, which retards the amount of business that might be done.

Fig. 2 is an illustration of woolen yarn the fibres of which have undergone a process of dyeing, the effects of which are not shown in the illustration. The yarn is composed of cotton and wool fibres and it may, therefore, be styled a composite yarn. In some districts it is customary, (and quite as wise), to speak of it as containing 20, 30, or 40 per cent. of cotton, all depending upon the particular class of goods it is intended to be used for.

In the yarn illustrated, there is at least 25 per cent. of cotton incorporated with the wool fibres. If a woolen



firm is desirous of making certain classes of goods which necessitate an admixture of cotton, they require to exercise a certain amount of caution in the buying of the cotton they require, and the nearer the behavior of the cotton fibre approaches that of

wool, the better it is adapted for the purposes intended.

Although there are some thirty or forty different classes or varieties of cotton exposed for sale in the Liverpool market from time to time, there are perhaps only a few that are adaptable for mixing with wool fibres; among these may be mentioned rough Peruvian and rough Pernams. There are also others of a harsh nature that seem to come very near to wool in staple, but all quite different in structure, that are also used.

Fig. 3 is a photomicrograph, with a three inch objective of the composite yarn previously mentioned, and figured. It is generally understood that the fibres of woolen yarns hardly dispose themselves so regularly as those of cotton, consequently the ooziness of one is more marked than the other. This is due to the spreading character of the fibres. Therefore, a glance at the opaque illustration of the yarn shows how irregular the yarn really is, but as weft yarn it is well adapted for filling up the intersections of the woolen fabric.

Carding Cotton.

A few points may be considered with reference to cotton fibres sticking to or filling up the wire, more particularly the tops or flats of the carding engines. This is sometimes caused by carding cotton which has just been received at the mill, hurried through a bale breaker, and used straight-away. Cotton thus used is generally a little damp. The wire, being highly polished, is very susceptible to the slightest dampness either in the air or cotton. If it becomes rusty it causes some of the fibres to stick to so many points, and these collect others, filling the wire up in a very short time. Other causes are the roughness of the wire due to side grinding and the after polishing process, and also in some makes of wire to imperfect hardening and tempering.

Want of sufficient angle from point to bend and bend to foundation will cause the fibres to stick and also cause the wires to break out. The wires should not be set in the foundation too straight up if they are expected to strip clear. Some cards will stick if they stand on a damp floor, or have been placed in a cold draught from doors, windows, or skylights. For cards which stick through dampness, separate steam pipes arranged above them is a good thing, keeping the temperature evenly at from 70° to 75° F. If cards, in transit from the machine works to the mill, are not properly protected from the dampness in the air, they invariably stick, due to their surfaces having become a little roughened by rust.

A good treatment for cards which have filled up from any cause is as follows: Get all the caked or filled up cotton from the spaces between the wires by means of strips of card filleting, a little wider than the wire on the flat, and about 6 in. long. Press the two wire surfaces together with the angle of the wire in the right direction, so that when the strip is pulled up by one hand and held slightly down with the thumb of the other it will remove all the caked fibres. If this process is too slow or too costly, then the next best thing is to cover a wooden roller, about 6½ in. diameter, with stripping fillet in rings, so that the wire points will enter the flat wire straight. Set the roller about ⅛in. into the flat wire and run the brush slowly, from 20 to 30 revolutions per minute. This brush will clear the fibres out of the wire very effectively when the bristle brush in front is revolved slowly in the opposite direction to the normal, and at the same time the brush can be stripped periodically by the hand card.

After the filled up cotton is all removed burnish the tops, using chalk on the brush, which will help to polish and smooth the wire. Afterwards grind the tops efficiently. This process may have to be gone through several times before full satisfaction is attained. Formerly, when mild steel wire was more common, bristle brushes for the tops were not necessary at a good many places, and the tops were cleaner than they are gen-

erally at the present time with bristle brushes. This brush, which should clean the tops of fibres of cotton left on by the stripping comb, must be set to clear the foundation, or it will drive the fibres into the wire. The brush working through the side ground wire points gets worn in an irregular manner, and the long bristles usually felt the fibres in the tops. If the bristles are split by the wire, or thin ends are worn to a fine point, the brush requires trimming either by a machine constructed for the purpose, by scissors, or by singeing whilst rotating with a hot iron. The brush can be placed between the centres of the fast and loose headstock of a lathe.

Trimming or singeing causes the bristles to be less soft and yielding, and to have, therefore, a better cleaning effect. Singeing is objected to by some managers, on the ground that the hot iron produces small burnt balls on the ends of the bristles, and these stop in the wire and cause the cotton to adhere to them. On the whole, better results are obtained by a machine specially made for clipping the bristles, as clipping with scissors is generally unsatisfactory. In setting bristle brushes they should always be clear of the foundation. If they are set to penetrate 1-16 in. in the wire it will be sufficient with good brushes.

The stripping comb should be perfectly parallel to the flats, and set just to clear the wire thereon in any position the comb assumes. Most readers will be aware that it cannot be set exactly concentric with the flats owing to its being worked from a different radius, that is, it is not worked from the same centre as the flats move round. There is one point which the writer would like to see discussed in this journal. Seeing that it is the extreme point of the wire which does the carding, why is side grinding preferred to using hardened and tempered steel wire of rather finer section than is at present general, thereby securing the extra space for dirt now obtained by side grinding, and doing away with this and the after-polishing processes, leaving the outer skin of the wire unbroken?—[J. Thorpe in Textile Recorder.

New Cotton Baling Machine.

There is about to be presented to the cotton planters of the South, a new cotton baling machine for making a cylindrical bale, in competition with the one owned by the American Cotton Co. and manufactured at Chicago, which has of late been urged upon the planter. The new baling machine is owned by the Planters' Compress Co., of Boston, in which Gen. Stephen M. Weld is largely concerned. We understand that Mr. Weld has been in the South exhibiting a specimen bale which the machine can produce, for the purpose of getting Southern people interested in it. This company has been organized with a stated capital of $5,000,000., and intends to manufacture the machine and introduce it throughout the South, by organizing branch companies in every cotton State, with local capital. It expects to have the machine in readiness for the next cotton crop. The inventor is George A. Lowry, a man known for his mechanical ingenuity. The value of this machine is yet to be demonstrated. The machine is intended to be attached to a cotton gin, and to receive the lint and compress it into a round bale 18 inches in diameter and 42 inches long, each bale to weigh about 250 pounds. The cotton is to be packed in spiral layers, and its density will be about 44 pounds to the cubic foot. The cotton goes in at the top of the machine, very much like meat into a sausage machine, and comes out at the lower end in a roll, ready to be baled. Those interested in it inform us that it takes about five minutes to make a bale. A knife that works automatically cuts the roll of cotton off just the intended length of the bale. The bales are to be encased in cotton duck, and held together by four wires, all of which weigh not over two pounds. The covering is estimated to cost about 22 cents, and the saving on every bale is put at between three to four dollars a bale. In order that our readers may obtain a detailed idea of the machine we illustrate, in connection with this

article, certain of its features, as follows:

A suitable framework "A" is provided upon which the press is mounted. The press comprises a receiving-chamber "D," into which the cotton is introduced, and a cap-plate or cover "M." The chamber is preferably

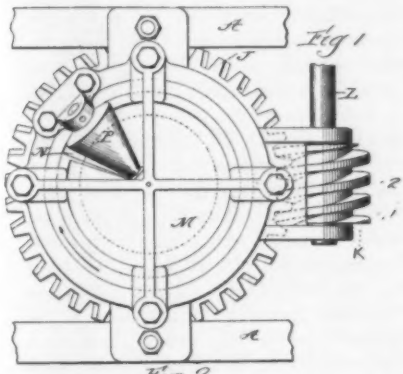
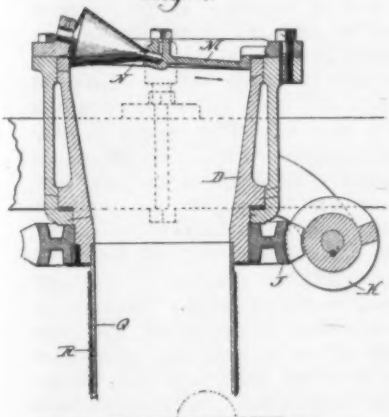
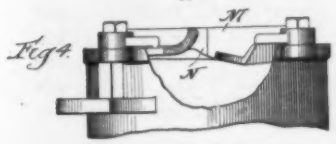


Fig. 2.





open-ended, as shown, and the cap-plate is arranged over one of the open ends of the chamber. The object of making the chamber open-ended is to provide a practically unobstructed passage from the cap-plate through the chamber, in contradistinction to the class of presses in which the material in its passage is compressed against something, whether stationary or movable.

The cap-plate is provided with a slot or opening "N" through the same, through which the material to be pressed is introduced to the receiving-chamber. This slot is arranged radially in the cap-plate. The surface of the cap-plate, which is arranged to project into the receiving-chamber, is formed to project to a progressively-increasing depth into the chamber from one edge of the slot or opening "N" to the other edge thereof, as shown in Fig. 3.

It will be seen that by continuously introducing the material to be pressed into the receiving-chamber and simultaneously therewith relatively rotating the chamber and cap-plate, the material is subjected to a progressive pressure, due to the action thereon of the peculiarly-shaped surface of the cap-plate, which is arranged to project into the receiving and compression chamber.

The inner surface of cap-plate is shown as being formed into a spiral. The chamber "D," is rotated by a gear-wheel "J" driven by the gear "K."

The mode of operation of the press is as follows: The chamber "D" is first filled with the cotton to be pressed, either by hand or otherwise, and then the cap-plate "M" and said chamber are assembled with the peculiarly-shaped cam or spiral surface of the cap-plate projecting into the chamber. Now by imparting a relative rotation to the chamber and cap-plate and simultaneously therewith introducing additional cotton to the chamber through the slot or opening in the cap-plate, such relative rotation accomplishes two important functions. In the first place it effects a continuous drawing or feeding of the additional material into the chamber, and in the next place, such relative rotation imparts to the material thus continuously introduced to the chamber a progressive pressure, due to the action of the peculiar shape of the surface of cap-plate projecting into the cham-

ber. The cotton to be pressed may be delivered by hand or in any convenient manner to the slot "N." By reason of the relative rotation of the cap-plate and compression-chamber and the coincident introduction of the cotton to the chamber through the opening in the cap-plate it will be seen that the cotton is formed into spiral layers and subjected to a progressive compression. On account of the relative rotation of the cap-plate and chamber an unfilled space in the bale is left at the axis of rotation. In order to remedy this, and with the object of producing a solidly-formed bale, the internal diameter of chamber "D," as shown in Fig. 2, is contracted from the end adjacent to the cap-plate to the other or delivery end of the chamber. By this provision a lateral compression is imparted to the body of the bale as the cotton proceeds through the chamber, thus efficiently compressing the bale into the unfilled space at the axis of rotation. The formed and compressed bale emerges from the open end of the chamber "D," and by suitably arranging a cover "R" over the delivery end of the compression-chamber—as, for instance, by telescoping a sack or covering of bagging or other suitable material over the end—it will be seen that the bale as it emerges from the compression-chamber simultaneously therewith receives its permanent covering. When a sufficient length to form the desired length of bale has been thus projected from the chamber, the bale is then broken off, the spiral character of the layers of material facilitating and readily permitting the breaking off of the bale, notwithstanding the degree of compression to which the material has been subjected.

It will be understood that the pressure exerted by the surface of cap-plate "M" upon the cotton is resisted by the friction of the inner walls of the chamber "D" and of the delivery-tube "Q." By varying the length of extension "Q," the resistance to the pressure exerted by cap-plate "M" is varied.

The Appleton Company.

The late meeting of the Appleton Co., Lowell, Mass., was a very important one, not only for that corporation, but possibly indicative of a series of changes that may be brought about on the part of other corporations, to meet new conditions in manufacturing. It was voted to reorganize the company on a new basis, and the steps in this process, which were taken without dissent of any of those present at the meeting will be: First, a reduction of the capital stock from $600,000 to $150,000, changing the par value of the shares from $1,000 to $100 each. Second, the putting in of $300,000 additional capital to put the plant on a working basis, giving each stockholder in the old company the right to take two shares of the new stock for each share of the old stock at the reduced valuation, and a right to a half-share in addition. Then each holder of one share of the old stock will be allowed to subscribe for four shares of the new stock at $100 each, so that if all the holders of the old stock use their rights the company will have a working capital of $450,000, ($300,000 of new and $150,000 of old stock.) The affairs of the new company will be put into the hands of new men, A. G. Cumnock of Lowell, for many years agent of the Boott Manufacturing Company of that city, being chosen as the new treasurer.

According to one report, the property of the company was represented to be worth $815,775.32, and the assets, $695,204.54. Another estimate placed the value of the property at $444,218.22. The stock of the company was originally worth $1,000 par, and sold at one time as high as $1,300. Today, it would probably not bring over $250 a share, if any considerable amount was thrown upon the market.

—On examining a traveller that has been working on any ring frame under normal conditions, it will be found that it is worn on that point which touches the inside of the ring.

WOOLEN DEPARTMENT.

Science and Practice of the Construction of Woven Textures.

FRED BRADBURY.

(Continued from February.)

Consider for example, a glacie fabric is composed of 2/220s cotton warp and 1/20s mohair weft, weave to be plain.

A cross section through the warp and weft is shown respectively at "A" and "B," Fig. 16, before compression takes place, and similarly at "A" and "B," Fig. 17, after the fabric is finished and where the weft yarn is seen to be compressed. For convenience we shall speak of the increase of the diameter of the weft as given, the piece might "a' b'," Figs. 16 and 17, respectively, as an increase in the diameter of the weft in the direction of the warp, and a decrease in the diameter of the weft across "c d" or "c' d'," as a decrease in the diameter of the weft at right angles to the warp.

A consideration of the foregoing, together with the diagrams Figs. 16 and 17, involves the following:

1. An increase in the diameter of the weft in the direction of the warp, which necessitates a decrease in the number of weft threads per inch. 2. A decrease in the diameter of the weft at right angles to the warp, which makes it possible to increase the number of warp threads per unit of space.

Diameter of above warp, 2/220s cotton, equals 1÷276 inch.

Diameter of above warp, 1/20s mohair, equals 1÷95 inch.

Allow for increase in the diameter of the weft in the direction of the warp, one-half the original diameter of the weft. This can easily be arranged for when setting the fabric in the loom; thus, taking the diameter of the weft as given, the piece might contain 95 threads per inch, but if it were woven with an allowance for an increase in its diameter by compression of half its original diameter as above, the fabric would then contain, $(1\div95) + (1\div190) = (3\div190) = (1\div63\ 1\text{-}3)$, threads per inch.

During the subsequent processes of finishing, these threads would be subjected to compression so that their periphery would practically touch each other. Any further compression would prevent the warp threads from producing a perfectly straight line in which case the best results would not be obtained. Then the diameter of the weft through "c' d'," Fig. 17, can be found by the application of the previous formula.

Let "T" stand for 22÷7, and let "X" stand for the diameter of thread through "c d," and since the area of the cross section of thread (Fig. 16) $=$ $(T \div 4) \times (a\ b)\ (c\ d) = (T \div 4)\ (1 \div 95) \times (1 \div 95)$; also (Fig. 17) $(T \div 4)) \times (a'\ b')\ (c'\ d') = (T \div 4) \times (3 \div 190) \times X$; hence $X \times (T \div 4) \times (3 \div 190) = (T \div 4) \times (1 \div 95) \times (1 \div 95)$; therefore $X = (2 \div 3) \times (1 \div 95) = 1 \div 142$ of an inch.

Therefore the thickness or diameter of the weft at the point of intersection with the warp equals 1÷142 of an inch.

We have previously demonstrated that the maximum number of warp threads which the finished fabric must contain when the warp threads lie perfectly straight is only obtained when the angle formed by the weft is one of 45° (see Fig. 11). Any lower angle requires a relatively less number of threads.

We have also shown that when the angle of 45° is maintained the number of warp threads per inch which the finished piece must contain is equal to the denominator of one diameter of weft plus one diameter of warp, thus, in the previous example:

Diameter of weft equals 1÷142 inch.

Diameter of warp equals 1÷276 inch.

Therefore the maximum number of warp threads per inch which the

finished cloth would naturally contain equals $(1 \div 142) + (1 \div 276) = (1 \div 93)$ of an inch equals 93 threads per inch.

This same result would be obtained by the application of formula III. (February issue) previously given. The particulars as above would produce a fabric quite firm in handle, thoroughly balanced in structure and highly satisfactory in most ordinary textures, but for obvious reasons it might frequently be necessary to produce a fabric which is softer in handle. This might involve one or both of the following conditions, viz: A decrease in the angle formed by the weft yarn, or a decrease in the amount of compression together with a decrease in the angle of curvature of the weft. In addition to the above it is frequently found necessary to decrease the angle of curvature of the

Fig 16 A

Take up of Warp in Weaving = 10%

Fig 16 B

weft, by relatively reducing the number of warp threads. These reasons vary with the essential conditions required to be made prominent in each type of cloth. Thus, for instance in the production of fabrics such as we are now considering, lustre or brightness is the principal feature, hence their name "glacies, lustres or bright goods." With this purpose in view, then, we use a yarn possesing as much lustre as possible having due regard to economy.

Yarns produced from mohair and alpaca are typical examples. Through every process of yarn preparation such as washing, preparing, combing, drawing and spinning, great care is exercised to retain as much as possible of the original lustre of these wools. In a similar sense the manufacturer desires not only to maintain, but to display as much of this lustre or brightness as possible in his woven products. Lustre may be said to be perceived when two masses of light are manifest at the same time. One of the chief factors which contributes to the lustre of the above wools is the exceptional length and breadth of the individual epidermal scales. These possess relatively a greater unbroken area than those of most other wools, consequently when these greater and unbroken surfaces are presented to the light falls; that is, if light falls flect more light. The visible effect and reflection of light is always slightly modified according to the different substances and the condition of the surfaces of the bodies upon which the light falls; that is, if light falls simultaneously upon silk, cotton, worsted, woolen or velvet material, the visible effect would be quite different, according as the surfaces are smooth, glossy, rough or corrugated; and again if light falls on water at a slight angle the amount of light reflected is considerably more than if it fell perpendicularly to the surface, and the same is true of any other substance according to the nature of its surface. Polished surfaces reflect light not only in large quantities, but as it were, draw the light well together in sharply defined masses. With unpolished surfaces this is not so, the light which falls on them being scattered about in all directions. In the manufacture of many figured fabrics we, in a certain degree, consciously or unconsciously, make use of the knowledge of this truth; that is, weft flush or sateen weaves reflect the light in greater masses, since the threads lie close to each other with comparatively small interruption, while hopsacks, crapes and broken weaves disperse the light; hence, when these two principles of weave structure are contiguous, different degrees of light are visibly reflected.

Further, consider the apparently different shades which can be produced in a pile fabric where certain portions of the pile threads are cut, while others are left uncut. Though the pile

threads are of the same material, quality, and whiteness throughout the whole woven fabric, two distinct shades, one light, the other dark, are distinctly manifest. This difference is due to the threads of the uncut portions having a greater reflecting surface than those of the cut portions. Consequently the former exhibits more light, while the latter disperses or breaks it up.

Bearing in mind all that is involved in the foregoing, let us consider the construction of a glacie fabric. The warp is usually fine cotton varying from 2/100 to 2/220's cotton counts. The weft varies in typical examples, from 16's to 24's, worsted counts; thus showing that we have much more of the lustrous than of the non-lustrous material. Our object is to display on the surface of the texture as much of the lustrous material as is possible with the structure of the

Fig 17 A

Warp straight after Finishing

Fig 17 B

cloth. To attain this object there are several factors to be considered:

(1.) The amount of compression or flattening which the weft receives after being woven.

(2.) The amount of reduction in the angle formed by the weft.

(3.) The warp must lie straight so as to allow the weft threads to lie close to each other and to apparently cover the warp threads.

In the first case it should be obviously clear that if the surface of the weft threads be compressed or flattened so that their diameters in the direction of the warp be increased, we obtain relatively an increase of unbroken reflecting surface, for the same size or weight of yarn.

Secondly, if the angle formed by the weft, as in Fig. 11, be reduced from its maximum of 45° to one of 30°, an increase of unbroken surface is also evident and the tendency of the yarn to disperse the light is also lessened.

It would be unwise to make any further reduction in this angle inasmuch as it would involve too great a reduction in the number of warp threads in the cloth, and so result in the construction of a texture of too flimsy a character. The third factor mentioned above is self-evident and involves no further reasoning or consideration.

(To be continued.)

The Sateen Arrangements.

Although the planning out of sateen arrangements is in reality on the square or oblong basis, the effects produced are so peculiarly different, and in certain classes of design for textile fabrics are so much used as to warrant a special explanation. The term sateen is derived from the arrangement of warp and weft peculiar to what is known in textile manufacturing as a satin weave, which is a construction of cloth where the weft comes to the surface in greater proportion than the warp, or vice versa, in a certain definite order. In these sateen arrangements we have nothing to do with the construction in regard to the building up of the cloth, but we make use of the peculiarity of distribution they give when applied to design purposes in the way of spacing out the units of the repeat. A series of arrangements up to sixteen places is given on plate 1, though it is not often that more than the eight ends is used.

The value of the sateen arrangements is most apparent in patterns with small repeats, where it is desirable that the repetition should not be evident. They are of great service, too, when a simple spot figure is used as the feature of a design, each spot making a unit in the repeat, which unit may be placed in different ways, as in the example of an eight-spot figure. The use of the sateen arrangements is advantageous because it en-

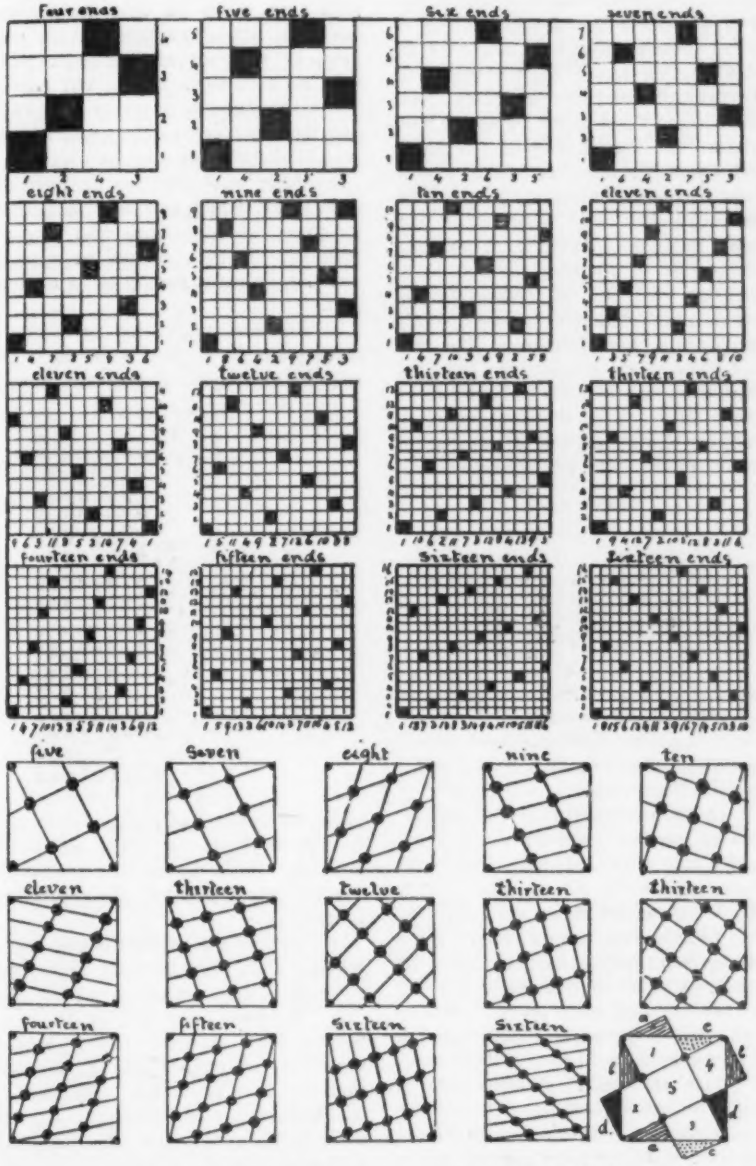
ables one, by a very ready method, to place the spots in such positions that the danger of faulty lining is reduced to a minimum. As an instance of this, if reference be made to the second diagram on plate 1 (the five-ends), it will be evident that if the eye were run up the squares from any of the numbers 1. 2. 3. 4. 5 at the bottom, or across from any of the numbers at the side, it will be stopped by one of the black squares, and in no case will there be a series of five white squares without a black square intervening; thus it will be seen that if the spot figures are placed upon these black squares there will be no danger of faulty lining.

Turning again to plate 1, it will be easily seen which of the numbers are the most useful one, viz., those that give an even distribution of the black squares. The numbers in which the black squares form into a diagonal line or twill should be avoided unless special reason. The method of finding out the disposition of the true sateen orders is as follows: Take a number that is less than half the whole number and yet will not divide exactly into the whole. Taking the five-ends as example, two is less than half the five, and also will not divide into five without leaving a remainder. Then two is the number to be used in counting out the squares. Referring again to the second figure on plate 1 (the five-end), we begin to count from the left-hand corner and mark the first square as number 1. Then count 1, 2, and place the next black above the 2 and on the second row; again count 1, 2, which takes us to the third place, and above the 3 on the third row mark the third black; beginning again at the left-hand corner, and this time counting the corner square, count 1, 2, we have the place for the fourth black above the 4 and on the fourth row upwards. Again counting 1, 2, we arrive at the figure 5; above it and on the top row, mark the place for the fifth black. Each black square is the place for the spot figure, or the most important figure of the design.

There is no particular way of learning the order for the six-ends except by remembering it as here given, 1, 4, 2, 6, 3, 5, and shown on the third diagram, plate 1. It is well to state here that in the higher counts it may often happen that there will be several numbers that will produce the same results; for example, arangements of the thirteen-ends sateen order can be made with the numbers three, nine, five and eight; one will generally be more satisfactory than the others for design purposes. In all cases there are at least two numbers that will find the order; for instance, in the five-ends, two or three will work; the first is the number used in the figure, the second is the arrangement that we should find if we counted the points as they occur from the left-hand side of the repeat. In a few cases where the count is a high one, there will occasionally be a number that will not apply by the rule given; a little experimenting will soon show what numbers will be satisfactory, those given in the figures being probably the most convenient ones.

The figures at the bottom of plate 1 are given to illustrate another method of arranging the same sateen orders. The system is based on the principle of dividing the square or oblong repeat into the same number of equal parts as there are ends required. As an example, take the first figure, the five-ends. The square repeat is divided into five parts of equal area, or more strictly speaking there are nine unequal parts, but these unequal parts can be added together in such a way that they will make five parts of exactly equal area, as before stated. How the different parts can be joined together is shown in the last figure on the plate; for instance, the black triangle D, inside the square repeat, can be placed against the incompleted square 2, and make it into a figure equal in area to the central figure 5. In the same way it can be shown that all the other incomplete figures can be added together. The different ways that the triangles are hatched or dotted in the figure will assist the student in adding together the different parts.—[Ornamental Design for Woven Fabrics, by Stephenson and Suddards.

—The fact that there is any decrease in the export of manufactured articles from this country is no indication of a larger domestic demand, which is always more desirable than that from foreign sources. When the domestic



ARRANGEMENTS BASED ON THE SATEEN ORDERS.

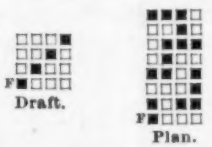
an unhealthy trade in our manufacturing industries, but it may be a legitimate sign of an improvement, due to demand for manufactured articles is good, the export trade necessarily suffers, as being less profitable.

Woolen Cloth.

PURE AND ADULTERATED.

One of the most noticeable facts regarding the woolen trade is that it has always made its home where there is an abundant supply of soft water. This was no secret, says a writer in the Textile Manufacturer, Manchester, England, to those early Flemings who selected the fine valleys of Yorkshire and Gloucestershire for their operations, a choice abundantly justified by the prosperity and success of the trade in these localities. They had soft water in Flanders, which is to this day some of the softest in the world, and invaluable for wool washing, dyeing, and finishing. The fact that some of the largest wool-washing establishments in the world exist there today, as a special business, washing wool for the spinneries of the distant inland towns, and yet charging only

DESIGN NO. 1.



nominal prices, is conclusive proof of the value of soft water.

It is important that the wool should be thoroughly cleaned, yet not burnt by caustic alkalies.

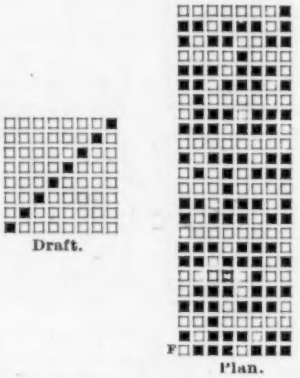
It is all-important that the suppleness of the fibres should be retained, hence the value of soft and mild scouring agents.

Generally speaking, most wools are easy to scour, and a mixture of water (75 per cent.) and ammonia (urine) (25 per cent.), at a temperature of 130° F., will accomplish that result. Where that scour requires any assistance, 5 to 10 per cent. of oil soap or curd soap is a safe and useful addition. As a matter of course, some few wools are more difficult to scour, and then an addition of sufficient soda ash will come in where it is needed. The flushing tanks have been in less use since the introduction of wool-washing machines, but not with the Belgians, who use most powerful flushing tanks, fed by centrifugal force, as their last process. Wool well prepared will card well, and with less loss in waste. It also follows that it will spin well, and with less waste in this department also. But its advantages will not end here, as a better and stronger yarn will be produced, which will weave better--produce a piece in less time and more perfect, to the great advantage of the weaver and the owners.

Selecting wool requires an intimate knowledge, which can only be gained by practical experience and a good training. It is a course of apprenticeship, either in reality or its equivalent.

In the first place, let us select a cloth made from pure wool, such are still in existence; and in the second

DESIGN NO. 2.



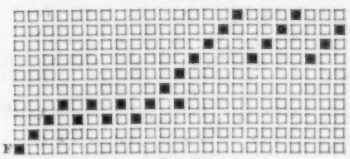
place, let us see how far that cloth can be reduced by manipulation and adulteration. Both classes find a market, the first being original, the second an imitation.

If we select a high-class beaver overcoating with very brilliant finish, we have to find a suitable wool. The first, or finest quality, is the one wanted for a superfine beaver, which wool now requires washing, and the care we have previously indicated in this article is now essential. A mild scour will not injure the fibres or their brilliancy, but a caustic scour will and should be avoided. The dyeing, to any shade intended for a wool-dyed cloth, should now take place, but if for a piece-dyed cloth, then we can

proceed to card and spin the wool in its white state. The warp twist should be from right to left, termed open band, and the weft exactly opposite twist, from left to right, termed cross band. Care should also be taken not to twist the weft hard, but to leave it moderately soft, a condition which produces a fuller nap or cover on the cloth.

A short wool gives this full nap or cover, which is a prime object in a fine beaver cloth; whilst a long wool would be deficient in this vital point. For instance, attempts by worsted coating manufacturers to produce a beaver from worsted yarns have been a dead failure. The fibres of worsted are too long for such a purpose.

DESIGN NO. 3.



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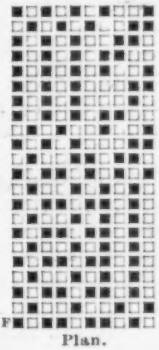


Plan.

We give the details and design herewith (No. 1) for the weaving of this cloth, and would point out the great importance of avoiding a "tight list" or selvage in the process of weaving. A tight selvage or list has a tendency to curl in the process of fulling, which fault is difficult to remedy. To avoid this curling, it is usual to employ a "hair list," which is a combination of coarser wool and hair, having much less fulling properties than the cloth, and which in reality ornaments the finished cloth.

Description of Yarns.—Warp A: spun to 21 yds. per dram; open band twist. Weft B: spun to 21 yds. per dram; cross band.

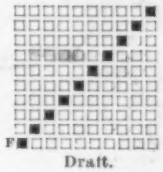
Warping.—A: 4160 threads, 75 yds.; also 100 threads; **hair list; on** 4 healds; straight draft 82 in. wide. Reed, 13 dents per inch; 4 in a dent.

Weft.—B: 64 picks per inch; faced finish; 56 in. wide; length, 54 yds.; finished weight, about 30 oz. per yard.

When well dyed in the best colors and well finished this cloth is fit for the London West End trade. At the present price of Sydney wool its cost is about ten shillings per yard. Of course, in lower qualities it can be made at any diminishing price, even as low as two shillings and sixpence. At this price we have a cloth suitable for a slop clothier for ready-made goods.

To produce this imitation cloth we have to employ a cotton warp, which should be spun from Egyptian cotton, as that cotton is stronger than American, and maintains its strength better

DESIGN NO. 4.



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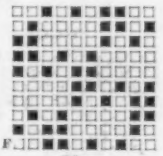


Plan.

under the finishing process. For the weft, we require Sydney wool (3rd quality) and fine new mungo of good staple. If for black or blue in the finished cloth we select a gray mungo, and if for brown or drab we select a drab mungo. This is for the face weft. For the backing, which is double the thickness of the face weft, we only require an inferior mungo, mixed with a small percentage of Peruvian cotton to make it spin. A "rep selvage" is the best for this cloth (requiring two extra heald shafts), to prevent the propensity to curl in fulling. A curled selvage does not take its proper shade in dyeing, and the piece is consequently damaged, hence the importance attaching to this point.

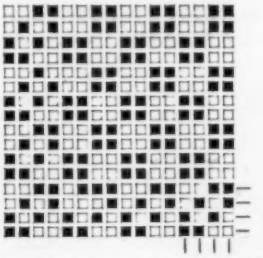
Design No. 2.—Warp: 2/40's Egyptian, 3952 threads. Face weft: 12 yds. per dram. Back weft: 5 yds. per dram.

On 8 healds straight draft. Reed: 13 dents per inch, 4 in a dent. Width in loom, 76 in. Face weft, 48 picks per inch; back weft, 24 picks per inch; total, 72. Mill to 54 in. Faced finish.

Design No. 3 is a fancy vesting, made of worsted, but equally applicable to cotton or silk. It can be finished in its natural color, for cream effect, and dyed in blues, browns, fawns, etc., for colors. The revival of fancy vestings is one of the features of present fashion, and as the demand for them in 1898 is expected to be larger than before, we give a few suitable examples. Neat and small effects always look well, and are the safest stock.

Design No. 3.—Fancy vesting-piece, dyed. Warp: 2/36's worsted, 4016 threads. On 10 healds, 67 in. wide in loom. Reed 15 dents per inch, 4 in a dent. Weft: 1/10's worsted, 60 picks

DESIGN NO. 5.



per inch. Shrinkage at fulling, 10 per cent. Clear finish, 56 in. wide.

Design No. 4 is another neat style, forming a bird's-eye, and looks well in colors. This can be worked out with the same details as No. 3.

Another class of goods in great favor happens to be ladies' tailor-made costumes, for which covert cloth and mixtures have been in good demand. One of the changes for next season 1898, will be small checks—black and white, brown and white, etc.—made from worsted. It is a most suitable material, and drapes well when made from 70's quality of worsted.

Design No. 5 is one of the styles warped 12 ends black and 4 white, and picked the same in weft. The chief style of check will be 6 by 6, woven in a two-and-two twill. Warp, 2/40's 4352 threads. Weft, 2/40's, 68 picks per inch. Reed, 4/17½=64 in. in loom. Finished width, 56 in., and 14 oz.

Wool Carding.

A word about grinding cards. This is a very important point to be considered, for if there is a bad point on the wire all one's labor is lost. Every part of the card should be ground until every low place is reached and every tooth is sharp. Most of the trouble derived from fancies is caused by insufficient grinding. Of course, it does not become necessaray to be grinding all the time as an excess of grinding is not profitable for the manufacturer, although it helps the card-clothing makers somewhat. A good point upon a card wire is very essential, in order to insure good work and good quantity, at the same time. Now if the cylinder of a card has a poor point, no fancy, however good, can prevent its filling up with stock, and keeping the fibres straightened out. If the doffer is in a like condition it fails to catch the stock as it comes to it, and much of it falls under the card. If the cylinder is in good order the fancy can be run lightly upon it, with slower speed, making less flyings.

The same care in grinding the workers should be observed. These should be run slowly, and if the lot is a mix they should be set as close as possible. If the above points are gained, then the workers will not be loaded too heavily, the stock will look even and clear, and a drawing will be made that will be free from specks. With the second breaker and finisher also in good order, the subsequent departments can produce excellent work and a good quantity of it.

Now, with the first and second breakers nicely adjusted, with the teeth of every part of the cards in proper order, there is no reason why good work should not be turned off. Still, a carding machine is like all other machines; it invariably has to be watched and attended to. A set of cards may be about right in every

way, yet, if this stock is not properly and evenly fed upon it, the result will be disastrous in turning out good even work.

Just one word about the finisher. Generally there is too much expected and required of the finisher card. Oftentimes it is pressed to accomplish that which the breakers should have done. The functions of the finisher is to carry along the stock evenly and condense it ready for spinning. Herein lies the tug of war, as the utmost diligence is required to produce good and even roping. Every practical carder knows the difficulties encountered, especially if the finisher is fed from spooled drawing. The automatic feed is by all means the one to run, and no card room is now considered complete without it. The Apperly feed on the finisher has not lost in prestige, and if properly applied gives good results in every respect.

In regard to the rings, there, above all else, must have a clear and sharp point. The wipe-rolls should run perfectly true, and should be set no closer than a twenty-six gauge, and speeded so that the web will come off nearly straight from the doffer. The sped of the rub-rolls must be duly considered, and great care should be given to their setting. They should be set very true, and the vibration should be short and the speed moderately slow. The running of the fancy on the finisher is a delicate task, and care should be taken in its grinding, setting and speed. If it throws the stock, it is bad; if it winds, it is fatal to good work. Usually insufficient grinding to the proper pitch is the cause of winding and throwing.

In conclusion I would say that care must be taken to have the stripper belts and all other belts in good order and tight, with no slipping of belts and gears, and with a good compliment of help and a cool head, the carder should be able to keep his end up.

G. B.

—Some interesting facts were brought out concerning the state of wool manufacturing in England, in the recent annual report of Lord Masham, to the share-holders of the Lister Co., Bradford. Much of the bad trade was attributed to the announcement of the McKinley tariff bill, which had an immediate effect in reducing the export business of the company from $1,000,000 to almost nothing. To bad business and low duties were attributed "the ruinous fiscal policy of fighting hostile tariffs with free imports." The report went on to say that the company has lost a vast amount of both foreign and domestic trade—"the German, French, Italian and Swedish. Everyone who manufactured anything in silk, were driven to the London market. The American market being closed to them, they all dumped their goods into the London market, and the Lister's had them all to fight."

—The average fleece of pure-bred Angora goats is from four to six pounds, but frequently eight and ten pounds have been obtained from choice, well-kept animals. Goats are longer lived, more hardy, live on poorer and less range, are freer from all kinds of diseases, and are less trouble to take care of than sheep.

—A person beaming a warp for a plain cloth which is picked with weft of contrasting colors, if he knew its liability to show cracks, would choose out the beam the barrel of which was perfectly smooth, and without flat places at the ends, in order to prevent any irregularity in the slipping of the rope or chain by which it is weighted in the loom.

—A great amount of mischief is often caused by beaming warps at a very high tension at the commencement, and neglecting to reduce the friction as the sections are getting entirely unwound.

—Considering the large diversity of fabrics which have been made and the schemes of weaving that have to be adopted in their manufacture, it becomes increasingly difficult to discover some compound structure that has not been previously originated.

KNITTING DEPARTMENT.

The Knit Goods Situation.

One need not be of a facetious turn of mind to recall the lines of the sentimental poem in viewing the knit goods market just at present.

"Only waiting
Till the shadows
Have a little longer grown."

The shadows are neither deep, nor ominous, yet there is a feeling of hesitancy in spite of the fact that trade in the West is capital, and buyers in that section have lately invaded New York city in numbers which have seen no parallel in years, if not in the history of the trade. As was noted last month, too, the middle Southern markets, such as Baltimore and Philadelphia, bought earlier than any other season within remembrance. It is New England and the extreme South that contribute the dispiriting features. And yet "down east" jobbers, such as those in Portland, are placing orders in reasonable volume and fully as early in point of time as in most years. Taking the country through, trade is about the same as last year for six weeks following New Year's, although the East, taken by itself, would show a decided shinkage. Beyond question, the labor differences in the cotton industry, and the sagging tendency in investment circles, following the Spanish imbroglio, are in large measure responsible for the wary feeling that dominates the situation at this writing. Prices show little change.

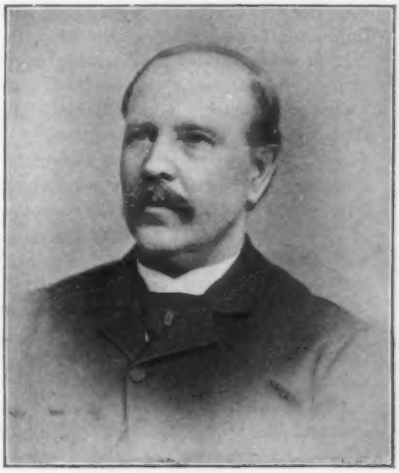
The unprecedented storms that have swept the Northern Atlantic seaboard and penetrated inland, have kept buyers out of market and paralyzed trade, since the movement for 1898 might have been expected to begin. The storms came too late to be of any real use to the heavy-weight goods trade and now the call of the fraternity is for low temperatures, in order that summer stuff can be moved. The small dealers, of course, constitute the million, and as things are at this juncture, they cannot be coaxed nor clubbed, except in the cereal districts west of the Mississippi, and the surrounding territory. No one who comprehensively surveys commercial conditions can doubt that the whole country is undergoing a metamorphosis regarding taste, and the gratification of those tastes, brought about by the steady settling of values to a lower basis of computation. These forces have been at work four or five years, but their influence has never been so potently felt as during the winter drawing to a close. Old lines in many instances seem to be losing their hold, novelties, for the time being, replacing them, or revivals of old ideas, which have so long laid dormant as to have the charm of novelty. In underwear, for instance, plush-back "brushed" goods are being more extensively shown than for a long period. This, probably, because the greatest values shown the last two years have been in fleeced goods, as consumers quickly realized. Hence a modification in the direction of a semi-novelty, to catch attention, amid vacillating patronage. In hosiery it is clear that fancies are going over to fall, and probably a good deal longer. Orders are now being liberally taken for mid-summer delivery. And it is the new designs in fancies that absorb most of the attention, to the neglect of some staples that had been considered impregnable. Aside from this activity in fancies, ingenuity seems to confine itself to such side channels as working double knees and heels into cheaper grades than ever before. Southern competition, in the way of home supply, is being felt in hosiery, as well as in cheap cotton cloth, and before the end of the century is turned, the Southern trade in low grades will have left this market entirely. To sum up, there is no expectation of more than minor shrinkages in values, owing to the healthy conditions that exist all the way be-

low the tremor at the surface. On the other hand it is equally safe to say that general advances are quite as unlikely. There is little disposition to exert pressure in order that goods may be worked off. Everyone appears to be willing to wait awhile until two or three of the clouds in the sky have rolled by.

Andrew Scotland.

Andrew Scotland was born April 21, 1831, in Kinross, Kinrosshire, Scotland, and received his education at a parochial school. He emigrated to this country with his wife, May, 1852, and settled in Albany, N. Y., where he commenced work for J. G. Root, in the spinning room of the latter's mill. Since then, he has been employed from time to time in starting up new mills and superintending them. At one time he was in charge of the spinning, etc., in the Egbert Mills, known as the Waterville Mills, where he remained for eleven years, or until the failure of Alden, Frink & Weston, in 1866, who were then the proprietors. In 1868, he assumed charge of the Hunt & Tollinghast Mill, Bennington, Vt., putting up and starting their English self-operating spinning mules. In January, 1869, he went to Cohoes, to set up and start the carding, spinning, etc., and to take charge of the same for J. Himes, whose mills were known as the Diamond Mills. In the same year he purchased a one-half interest in the Winooski Falls (Vermont) Knitting Mill, originally owned by Cole & Gill. Soon after, he purchased the other half interest in the concern, and in the fall of 1872, sold the machinery to John C. Miller, Amsterdam, N. Y. He then took the superintendency of the Alaska Knitting Mill, Waterford, N. Y.; thence to superintend the Gaysville (Vermont) Knitting Mill, for two years; thence, in 1882, to superintend Thomas Lape's Mill, Valley Falls, N. Y., where he remained two years; thence to superintend the Rankin Knitting Mills (Halcyon Mills), Cohoes. From this place, he went to Paris, Canada, to start and superintend the Penman New Plant No. 2; thence to Galt, to teach the son of the president of the Canadian syndicate how to manage their plants. On his return home, after a year's absence, Captain John Wilkes, of Charlotte, N. C., engaged his services, to go South, to start a knitting mill for him.

In the year 1890, above all competitors North and South, this mill took the gold medal at the State Fair at Raleigh, N. C., for the best style and grade of knitted underwear. After his return from the South, he started the National Hosiery Co., Cohoes, N. Y.,



ANDREW SCOTLAND.

and has been called to three other mills since, to give instructions to the help there employed.

Mr. Scotland is a thoroughly practical manufacturer, and the articles that he has contributed from time to time to this magazine have been greatly appreciated by our readers. He has given much attention, and has manifested a special faculty, to the starting of new knitting plants, being one of the best knitting mill men in the country. He has always been a strictly temperate man, having joined a temperance order as long ago as 1841. He is active in Sunday School work, and is a member of the Methodist Episcopal Church.

Hints on Practical Knitting.

J. H. QUILTER.

(Continued.)

Having studied the needle so that only the best needles will be selected, then comes the necessary care in seeing that each needle is properly fixed in the machine. They must be perfectly set, that is, be of equal distance throughout their length, in perfect alignment and level at the extreme heads. Now with a set of needles so arranged, we can commence to deal with the question of loop formation. The first essential is a proper thread, but for the present I prefer to leave this, dealing first with the method and implements used to form the loop.

It is essential to have a loop upon every needle, each of perfect size. Three methods are adopted. (a) The forming of a complete loop on each needle, consecutively across the width of needle; (b) Forming, first a loop over two needles and then dividing these into two equal loops, so giving a loop to each needle; (c) The forming of a loop between every two needles and dividing this into three loops. Each of these principles has its advantages under certain conditions, and disadvantages under other conditions.

As a rule, the principle is used in the coarsest class of machines, especially when such frames are used to make certain fancy fabrics: for shawls, mitts, gaiters, etc., specialities of the fancy hosiery trade. Principle "b" is found throughout the medium gauge plain trade.

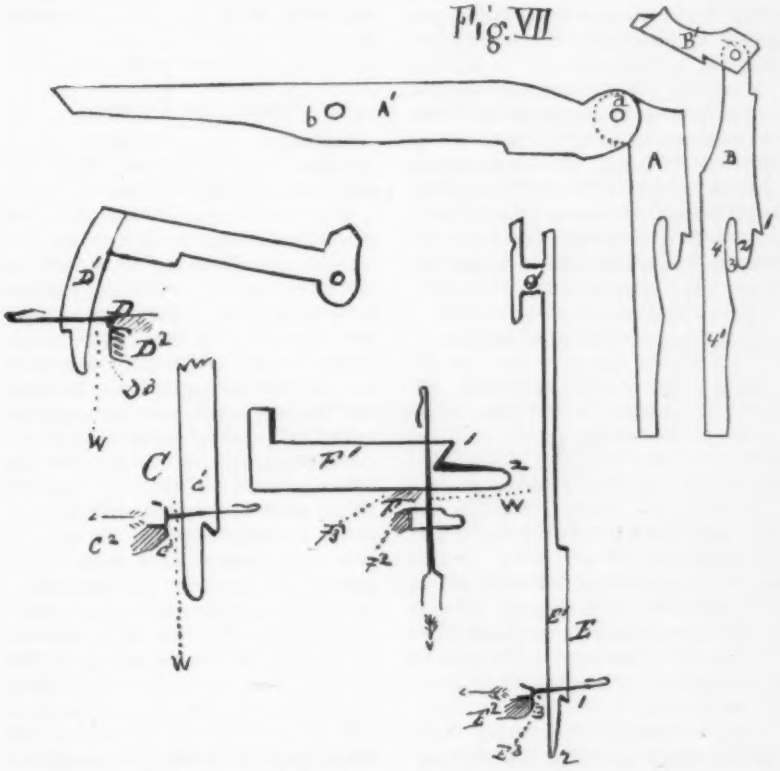
Principle "c" is exclusively connected with the finest grades of hosiery, as silk and thread goods. Taking power rotary frames, the loops are formed by sinkers, of which there are two kinds, those attached to levers (jacks) having an independent motion, and those attached to leads, which move in unison. It is the jack sinkers that forms the loops first, and the lead sinker that divides them as required. So on those frames where a loop is formed on each needle only, jack sinkers are used, while in the other principles there are one-jack and one-lead sinker, alternately, and one jack with two lead sinkers following; the former dividing the loop into two, and the latter into three, according to the principles first mentioned.

Fig. VII. shows the original jack and lead sinkers. "A" is the jack sinker secured at the top at "a" to the jack "A." It is upon this jack which has a fulcrum at "b," that the up and down motion is obtained of the jack sinker "A," and each sinker and jack being separately attached, have this movement individually. "B" is the lead sinker, secured at the upper end to a lead "E." These leads are each attached to a bar, so that their movement is all together Now, in loop forming, of which we are treating, those parts of the sinker, 1, 2, 3 and 4, are the parts with which we have to deal, and wherever the bearded needle is used, whatever is used to form a loop upon, such a number must have some parts equivalent to these parts of the ordinary sinker "A" or "B." The projection "I" is that which first deals with the thread, taking it between each needle to form the loop over 1, 2, or 3 needles as required. As there are always two loops to deal with in knitting, viz: the old loop and the new, then the old loop is kept away, secure in part 3, so that when the new loop is formed by part 1, part 2 prevents these loops from, in any way, becoming allied with the new ones. Now in moving the loops along the needles, the front part of 2 and the front part of 4, each brings forward their respective loops at the proper distance from each other, so that the two loops can be left as shown at No. 3 (January). This is a most important feature in all bearded needle machines, as is also the fact, that while the loops are travelling along the needle they must be held securely on the needle stem, so that they pass clearly under the needle beard; that is, those that have to pass under, unless such loops are held securely, have every tendency to catch the end of the beard and split the loops, a fault which often ends in the fabric breaking out into holes during the boarding or other finishing processes.

When the loops are close in position, in order that they may be left so that one can pass over the other when the beard is closed, it is necessary that the sinkers rise. Now in doing so, they must not disturb the loops. Some frames have a tendency to slightly move forward, and should they move far enough for the old loop to get too near the extreme end of the beard, often the old loop will get split, parts that are right, but adjust those that are wrong.

Needles and sinkers in many frames have a different relation to each other than those just explained. The needles, instead of being stationary have movement in the direction of their length, and the sinkers have a simple movement up and down, or to make and divide their loops. But having accomplished this, they remain stationary,

Fig. VII



which is another fault that needs the most careful attention.

Again, if the frame moves back in rising, the part of the sinker 2, Fig. VII., has a tendency to draw the new loop from under the beard, causing another defect. All these points need a careful study, as unless you have a correct understanding of the movement of the parts and the correct position of the loops on the needles, the altering of one defect will only cause others which may turn out worse. In correcting an evil never alter those the loop obtaining its correct positions on the needle by the movement of the needle as previously mentioned. As the sinkers have no swinging action, the lower part, as shown at 4' B, Fig. VII., is dispensed with. But though this is so, still the equivalent for this and also for the part 3, which also is done away with, is found in each system. "C D E and F" show the position of needle and loop forming parts of various systems of machines in which the needles are moveable. "C," shows a sinker attached to leads or jacks as

are "A" and "B" shown, but the lower part is dispensed with. The dotted line "W" shows the position of the old loop. The cavity between the sinker "C'" and the bar "C²" being equivalent to the part 3 of sinker "B," part 4, which controls the movement of the old loop when passing over the new is, in system "C," performed by the front edge of bar "C²" at "C²". Thus all parts are equal. System "D" shows a jack sinker of another machine. The parts 3 and 4 are here shown as between "D'" and "D²," and part "D³."

Machines where only one kind of sinker is used, as shown at "E," have an independent motion from "O" or top part of sinker. The same system is shown as at "E¹," "E²" and "E³." So important are these relative parts and the duty they each perform in the making of a row of knitted loops, that when the entire system of the machine is changed, even to a perpendicular moving needle, as shown in system "F," still the principles, as explained in system "B," have to be adhered to, though at "F" the needle moves up and down, in the direction of the arrow, and the sinker "F'" moves horizontally. Still the parts 1 and 2 are the same, 1 forming the new loop, and 2 to divide the new and old loops, part 3, where old loop, as shown by dotted line "W," is found at "F¹," while "F²" acts as part 4. The example here shown and explained, shows at once the necessity of a perfect knowledge of the fundamental principles of knitting.

Only two kinds of knitting exist, viz: bearded or spring needle knitting, and latch or tumble needle knitting; and when the principles upon which these needles alone can act to insure perfect knitting, then the trouble is overcome. The true point of this is on the line I have dealt with in this article. Follow the true position of the loops in their movements as formed and completed, and then, knowing their true position, next comes the study of each particular frame to determine by what means these positions are obtained, and what part each lever, rod, cam, etc., plays toward obtaining the object sought. For does not a machine simply consist of parts, each of which are indispensable, but all of which play some function in obtaining a particular relationship of needle and loop? Each screw is for some purpose, and before touching it, find out what is that purpose; and so with all other parts. With such study, only perfect knitting will result, as will be at once seen if the element of wrong doing is favored by wear and tear, or by imperfect movement of perfect parts.

(To be continued.)

Necessity for a Change.

Experience and necessity forces changes in methods that would not occur but for the failure to secure a profit, where no difficulty otherwise existed. In England, where the system of manufacturing is carried on, on an extensive plan, they are discovering that manufacturing, by their own make and devices of knitting machinery, is not the most profitable; as more labor is required to operate such, and the production is not as easily obtained as on our American machines.

Manufacturers of the present day need no reminder that the days of cheap labor and little competition no longer exist. There is a struggle to outdo one another in a reduction in cost and excellence of manufacture.

There is a necessity for a change; many of the mills that went under in the fall of 1896 and the spring of 1897, could not compete with the modern style of machinery. For a proof of this, look at the prices many of the plants brought which were sold at auction. Many did not bring over 20 to 25 per cent. of their original cost, and one or two brought less. Only one I know of, out of the many, brought near its value—the Tenendaho, of Mechanicsville, N. Y., which was purchased by two of its original owners, who had $40,000 invested in it.

It is marvelous to note how many of the textile fabrics of all styles and qualities, and for every conceivable purpose, that are now placed on the markets of the industrial world are

found to be the production of the knitting machine. Of late, a new machine has been invented, known as a warp weaving and knitting loom, producing a stitch similar to the flat frame, but with greater facility for designs, upon which excellent styles of both plain and fancy goods are being made.

There are circular frames having additional mechanism attached for the production of pile fabrics, which are often called plushes; while the double rib warp knitting loom has a capacity for a wide range of thick fabrics of like description. The former, if made on a fine gauge frame, from 24 up, with a very heavy pile, and cut fine, resembles velvet made on a weaving loom.

To such an advanced stage has the production of knitting machinery arrived, that, as already stated, it would be difficult to find a fabric that could not be very closely imitated. Our American mechanics have been studying out various systems of machinery with marvelous results, and should such skill continue to be devoted to knitting machinery, it would become a very difficult task to predict what may be its future. It is important for all those interested to watch with a careful eye, the successive improvements as they keep coming along, and make the most of those best suited to their different wants, and not linger in the old ruts of 10, 12 or 20 years ago.

I know of one mill that was sold this fall at a referee's sale, where I put in some of the machinery, (spinning, knitting, etc.,) 25 years ago, while four full sets were there eight years previous. This goes to show that it will not do, to try to manufacture with machinery that is not modern; for never before did knitted underwear, etc., appear in such bewildering variety. The invention and more general utilization of automatic machinery is leading to greater diversity in style, quality and character of knitted goods; and, in this sense, they tend not only to prevent overproduction in general lines, but also to create new or original applications of the knitted fabrics. However, with all this, there is a manifest tendency, on the part of domestic manufacturers, to produce better grades and styles; and the constant improvements being made in knitting machines are not only an evidence of progress in this direction, but the goods made on them speak in their favor.

Manufacturers of knit goods, in order to save themselves from ruin, in contending with the forces that surround them, must see to it, and get up and out of the old ways so many of them are in.

A man entering a store, asked for an undershirt. "Do you want a shirt that opens in the front or one that opens on the back," was asked of him. "Don't keer where it opens," answered the old gentleman, so that it's got an opening at the top, and another at the bottom." OLD SUPERINTENDENT.

Circular Rib Knitting Machinery.

A MECHANICAL STOP MOTION AND QUARTER SAVER.

One of the most essential features in a knitting mill is the economy in the production of goods. We take pleasure therefore in presenting to our readers a few of the features of a mechanical stop motion, as applied to circular rib knitting machines, for stopping the machine in case of the breaking of yarn, loose ends on bobbins, or cones where large knots or bunches are found in the yarn, this avoids what is commonly known as "quarter offs" or "press offs," and when this is avoided, a large expense of waste in yarn and goods, as well as time is saved, as every manufacturer and knitter will appreciate.

Mechanical, as well as electrical, stop motions have been invented and made from time to time during the past few years for circular rib machines, but none, it is claimed by the makers, has met with the success that this one has accomplished.

This stop motion is very simple and is adapted to the most tender yarns, as well as to stronger yarns of cotton, worsted, wool, lisle or silk. It works

perfectly and is adapted for any number of feeds that are used on a circular rib knitting machine.

These stop motions are not in an experimental state, as there are hundreds of them in successful operation at the present time.

Nye & Tredick, the well-known manufacturers of circular knitting machinery, can supply these stop motions to the trade and will be pleased to show them in operation at their office and show rooms, 606 Arch St., Philadelphia, Pa.

They solicit correspondence and inspection. Call on or address them for full particulars.

English Knitting Patents.

The following patents have been taken out lately in England:

"Manufacture of knitted fabrics and apparatus therefor." Has reference to means designed more particularly for producing "press-off" fabric on rotary plain and rotary rib knitting machines and Cotton's patent frames. "Press-off" fabric has heretofore only been produced on hand-knitting machines, but by this invention the inventors are enabled to produce on power frames numerous fancy patterns which it has been impossible to produce up to the present on power frames. In the case of a rotary frame, the frame performs the ordinary knitting operation as usual; but the presser (which is a tuck presser), besides coming down once in the ordinary manner, is by means of extra pressure cams brought down at the time the loop is being brought forward, thus pressing off a certain number of loops. The pressure is then shogged automatically, so that when the frame goes through the ordinary knitting operation above referred to, the presser acts as in the ordinary work, thus pressing twice in the formation of each course, or in each revolution of the frame. The apparatus for thus automatically actuating the presser may be applied to hand frames. In the case of a Cotton's patent frame, instead of the presser falling twice as above referred to, the needle bar is caused to rise to meet the presser; the presser being a fixture, and the needle bar being operated by extra presser cams.

"Circular knitting machines." The object is the provision of means for enabling a splicing thread to be inserted and withdrawn with certainty and accuracy at any predetermined needle, and at any particular course or part of a course; also means by which the splicing thread may be held in and out of action for any number of courses or parts of courses; means for cutting and for holding the cut end of the splicing thread when it is thrown out of order; means for ensuring the splicing thread being delivered to the needles when it is thrown into work and means by which the splicing thread may be automatically thrown into and out of action. The machine is fitted with an additional bladed wheel, which is constructed and mounted similarly to the bladed wheels now in use, but has certain blades shaped to allow of the splicing thread being thrown into action, and other blades shaped to allow of the splicing thread being thrown out of action. The splicing thread guide is arranged under the blade wheel, instead of over the same as is usually the case, and is carried by an axle which is oscillated by cams or pattern mechanism. The mechanism for cutting, holding, and guiding the splicing thread, is suitably mounted and may be operated from the splicing thread, guide axle, or by independent means, the whole mechanism being so arranged and timed that when the splicing thread guide withdraws the thread from the blade wheel it is moved between the cutters which divide the thread and hold the cut end. When the thread is to be again introduced, the cut end passes from the holder through a guide, which ensures it being delivered to the needles. The mechanisms may be operated by cams on the needle cylinder, by independently operated cams, or by pattern mechanism, or the motions may be obtained from cams which are thrown in and out of action by pattern mechanism, which may act

upon the cams or upon the cam trucks, and in some cases the pattern mechanism is replaced by mechanism operated by hand.

"Knitting machines for producing surgical elastic work." The inventor claims forming the needle guides in section, each carried by the needle bed, in such a way that its rear end can be raised or lowered either to bring the nebs on the tail ends of the needle into position to be acted on by the reciprocating cams, or out of position, to be acted on by them; and the combination of the needle bed or supporting bar, formed with a nose or projection standing up from it, the sections of the needle guides fitting loosely at their front ends on to this projection, a bar or plate holding down the front ends of the sections and slides acting on the tail ends of the sections to raise or lower them.

Weight of Yarn.

Below is a method for ascertaining the weight of yarn in a case:

First weigh out five pounds, and take the quantity of cops required to make this weight; divide the gross weight of yarn and cops by 5; the result when multiplied by the number of cops in the five pounds, gives number of cops in total weight.

Second, weigh first one-half pound of empty tubes, and divide the total tubes in case by the number of tubes in one-half pound, and the weight of tubes results.

Example 1: Gross weight of yarn and tubes equal, say, 300 pounds, and 5 pounds equal 50 tubes. Then $300 \div 5 = 60 \times 50 = 3{,}000$ tubes in case.

Example 2: One-half pound of empty tubes contains 175 tubes.

Now $3{,}000 \div 175 =$ number of one-half pounds of empty tubes, which can be brought to ounces, as $3{,}000 \div 175 = 17\ 1\text{-}7 = 8$ pounds, nine ounces.

Fancy Hosiery.

A foreign exchange says that some dealers expect next spring a greater inquiry for this class of goods. The supply will of course be much larger than at present, the hosiery centres of Europe—Chemnitz, Troyes, Leicester, and Nottingham—being full of orders for spring trade. The question arises, is fancy hosiery going to be a season's fad only, or is it going to take a permanent hold upon fashion? It is hard to say, and the answer can probably be obtained by comparing the belief of some dealers who anticipate a good business in it for next year and no longer, with that of other dealers who think that fancy stockings have come to remain for some years. At present, Scotch tartan plaids are in great demand. There is, however, a good sale for stripes, one dealer going so far as to say that anything in fancy hose sells provided the colorings blend well and are not too pronounced. From what has been said, therefore, it would appear that the fancy hoisery trade will be very large for some time to come, and that American manufacturers may find it worth while to experiment, to ascertain whether it will pay them to secure a share of the trade.

—The question as to whether it will pay American hosiery manufacturers to enter into the fancy hoisery trade is now being considered by some prominent mill owners and inventors. Machines for making fancy hose are expensive. The cost of altering old machines to adapt them to fancy hose manufacture would be great. Skilled labor is necessary to operate these machines, an ordinary "stockinger" not being competent to undertake the work. Study and practical application is necessary to develop an operator, and that takes much time, and when the machine is started, only a small quantity of fancy hose can be turned out, compared with staple solid colors. When to that is added the additional prices paid for labor in the States it becomes a serious problem. Fancy hose is to-day the most successful branch of the trade; at present the supply is not as great as the demand.

POWER DEPARTMENT

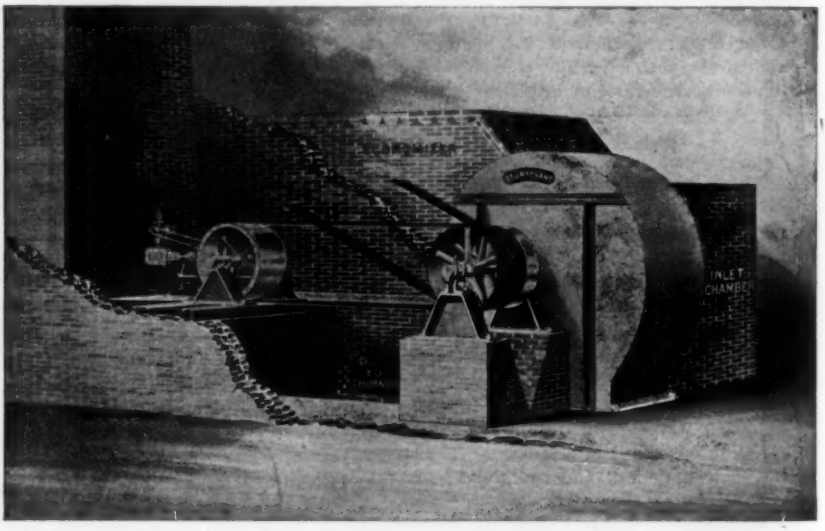
O. R. YOUNG, M. E., Editor.

Advantages of Mechanical Draft.

Engineering societies and the technical press have discussed the subject of mechanical draft, at greater or less length, but seldom broadly. The introduction of mechanical draft is the evidence of a radical departure in certain features of boiler practice, yet extended and recent experience clearly indicates the permanence of this departure. A progressive engineer will not adopt the chimney as the sole means of draft production, but will first carefully consider the respective advantages of the chimney and the fan, for the claims of the latter cannot be disregarded.

The chimney has long stood as practically the only available means of producing draft, which, thus produced, has been commonly called "natural draft." If the chimney satisfactorily met all of the requirements for modern boiler practice, one would scarce expect to see a substitute proposed. But the very substitution of another means is the strongest evidence of the acknowledged inadequacy of the chimney, not to produce draft, but to do it as satisfactorily and economically as the substitute.

Primarily introduced for the purpose of increasing the rate of combustion, artificial draft was designated as "forced draft," its field of application being considered to begin where that of the chimney ended. By later refinements, it has, however, become not only a means of assisting chimney draft, and of producing the conditions requisite to accelerated combustion, but it is now accepted as a convenient and efficient substitute for the chimney under all ordinary conditions. The extent of its success and adoption must evidently be a measure of such convenience and efficiency. The chim-



INDUCED DRAFT PLANT.

ney is an exceedingly inefficient device for moving air, and it is readily shown that a fan requires so little power by comparison, that, considered simply as the means by which air is to be moved, the fan possesses advantages far above the chimney.

The centrifugal fan, or fan blower, as an apparatus for producing draft, is no new thing. As applied for the purpose of ventilating, it dates back to the sixteenth century, but as a substitute for, or auxiliary to, the chimney its first application appears to have been made early in the present century. In 1827, Edwin A. Stevens, of Bordentown, N. J., arranged for a fan for forcing the air into the ashpits of the boilers on the steamer "North America." In conjunction with his brother, R. L. Stevens, he subsequently experimented at considerable length with various methods of applying the fan. It is said that in 1824 John Ericson fitted the British steamer "Victory" for forced draft by means of a fan, and it is certain that in 1830 the "Corsair" was so equipped by him.

The very adaptability of mechanical draft is indicative of the fact that it is more flexible than that produced by the chimney, is more readily controlled, and less influenced by climatic changes, while the apparatus for its production is more readily transported and has a higher potential value than a chimney. To a considerable extent these stand out as the conveniences of this method, regardless of their economies. When it is shown that increased efficiency can be secured by a method that is more convenient, the advantage of mechanical draft is established. The actual omission of the chimney is sometimes of far greater importance than would at first appear, while the readiness with which the rate of combustion may be increased is doubly appreciated when it is shown that under proper conditions the efficiency of combustion may be increased thereby. The purely economic features are presented most prominently in the ability to utilize low-grade fuels, the resultant economy being shown in numerous examples that might be given. The economy in the quantity of fuel consumed has, in its relation to the use of mechanical draft on shipboard, an advantage which is closely allied to that resulting from the decreased space occupied.

The economic results which may be secured through the introduction of mechanical stokers and devices for utilizing the waste heat of the gases are rendered most evident under the conditions of mechanical draft production, as are also the great advantages of preventing smoke and the blessings of good ventilation as they are exemplified on shipboard. The facts that the size of a boiler plant required for a given output can be reduced when a fan is substituted for a chimney, that the cost of the mechanical draft plant is usually far less than that of the chimney draft plant, and that its operating expense is likewise less under proper conditions, all point most conclusively to the purely economic advantages of the method.

The accompanying illustration shows an induced draft as designed for the Cheney Brothers' Silk Mills, So. Manchester, Ct. These mills have been in active operation for the past fifty years, and at the present time offer employment to about 2,000 persons engaged in the spinning, weaving, dyeing and printing of silk and velvet goods. The steam plant as a whole is not a new one, but one which has been extended and improved from time to time to meet the growth of the business. It is a plant, however, in which the owners fully recognize the advantages of modern labor-saving machinery and devices that tend to increase the economical generation of power. About two years ago the old boiler house at one of the mills was rebuilt, and new boilers, coal handling machinery, a flue heater or economizer, and exhaust fan for handling the products of combustion from the boilers were installed.

The general arrangement of the induced draft, as designed, is as follows: The fan is a special 7 x 10½ Sturtevant exhauster, so arranged in connection with flue dampers that the gases may be passed through the economizer

and the fan, as is usually the case in order to create sufficient draft, or direct to the chimney. The fan was designed with a special three-pulley arrangement, so that it could be driven either by the independent Sturtevant engine or by belt from the line shaft.

This mechanical draft plant was introduced in this plant to save the construction of an expensive stack, the old stack being in good order and amply large to discharge the gases when aided by the fan.

This points clearly to the necessity of increased draft in connection with an economizer. That a fan is more desirable than a chimney under these circumstances is evidenced by the following statement from Cheney Brothers: "The gases are discharged through a chimney 90 feet high. This chimney we used previous to remodelling our plant, and while it is higher than we actually need to discharge the gases from the fan, we find it a satisfactory arrangement, as it will give sufficient draft to start the fires and do our night work without using the fan. As our work is very variable we have never made any accurate tests, but feel satisfied that the fan has saved us the cost of building a new chimney at least 175 feet high, and that it is giving us as satisfactory results as we could have obtained by a chimney."

The induced system whereby a partial vacuum is produced within the furnace, is substantially the same in its effect as a chimney, which it most closely imitates in its action. It possesses, however, not only greater intensity, but other advantages that do not pertain to the chimney. In fact, it is the most natural method of applying mechanical draft, there is no change in arrangement of the boilers from that which obtains when a chimney is used, and there can be no questions as to its adaptibility when consideration is given to the high pressure differences and rates of combustion which are secured in a similar manner in locomotive practice.

It is, on the whole, better subject to control than the other systems, its leakage is always inward, avoiding inconvenience from flame and smoke at the fire doors, which, however, is only liable to occur under heavy air pressures and when proper damper arrangements are lacking.

It is cleanly, lends itself readily to control by the dampers which may be introduced for the purpose, and can by simple means be rendered absolutely automatic, requiring no attention whatever from the fireman. The early objection to this system, before it had been extensively adopted, was that the fans could not stand the high temperature of the gases passing through them. The best refutation of this statement lies in the fact that large numbers of the Sturtevant fans have been running for years under these conditions, handling gases from 300° to 500° in temperature, and even higher.

The essential feature of mechanical draft is a fan blower or exhauster. The peripheral discharge type of fan, therefore, stands as the only form which it is desirable to employ for the production of draft.

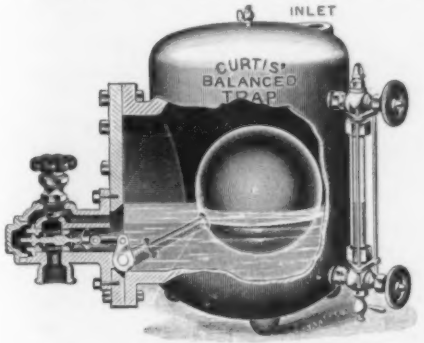
Steam Traps.

MADE BY D'ESTE AND SEELEY CO., BOSTON, MASS.

Every high pressure heating plant or any heating pipe not returning to the boiler should not be allowed to run a moment without a steam trap. No sane man would think for a moment of opening a pipe direct from his boiler to the atmosphere and try to get steam, and yet that is just what is done when a pipe is not drained by a trap. The amount of money wasted in this way on an ordinary steam plant in one season would pay for traps enough to last for years, and thus be one of the very best instruments which the owner or engineer could possibly make. While any trap is far better than no trap, it is always well to remember that a good trap costs little, if any, more than a poor one, and a purchase with a little care in making a selection can assure himself that he getting the best the market affords.

Four things should be required: First, efficiency; second, simplicity of parts; third, durability; and fourth, ease of making repairs when necessary. In all four of these points the Curtis balanced trap stands high, as may be seen by the following description:

The full prospective view shows a cylindrical pot with rounded ends, of the strongest form to resist pressure. On the side is a neck or nozzle of sufficient diameter to admit the float.

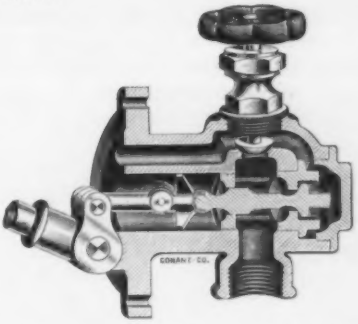


This nozzle is covered with a strong plate, to which is bolted the composition valve. It will be seen that when the plate is removed, it brings away the float and valve with it, which can be taken, altogether, to any suitable place to be examined or repaired, or can be shipped to the manufacturers, leaving the pot in place and connected.

The composition valve can be removed without removing the cover, by taking out the four tap bolts by which it is fastened; then the float steam can be pulled out far enough to unscrew it from the knuckle, leaving the float inside and cover joint intact.

The sectional view shows a valve body cast with strong ears to bolt it onto the cover of the trap. The valve consists of two discs of equal area on a single stem, one with a short sliding fit, and the other with a ground seat taper fit, which guides it onto its seat, while the valve stem is guided by a spider with three arms, and is loosely connected by a knuckle joint and stem to the float. The valve stem is in two parts, the outer one carrying the discs screwed into the inner one; and when unscrewed the valve can be taken out for repairs or grinding.

By removing the cap from the end of the valve body, the valve can be taken out without starting a joint, pipe, bolt or gasket. This is claimed by the makers as an entirely new, as it certainly is a valuable, form of construction. It is also provided with an independent passage or passby conly trap, so far as known, with the valve so easily accessible from the outside. It is also provided with an independent passage or passby controlled by a stop valve, and work can be continued and the water drained off, even if the discharge valve should remain closed for any reason. The float is very large, perfectly rounded, so hard that it cannot be dented, nor can it be collapsed at 200 lbs. pressure. It is made by a special process of an alloy with aluminum, and is practically indestructable. It is hermetically sealed as a glass globe, and is so located in the trap that the outlet is always sealed by several inches of water.



These steam traps have acquired their reputation in the last eight years simply on their merits. This is presented as a strong, plain, serviceable machine, and is warranted to work correctly under any disadvantage to which a steam trap can be subjected. They will work against any head or back pressure less than the direct pressure in the trap. Some of them are now working with 75 pounds in the trap, against 30 pounds pressure on the outlet, and deliver hot water into the second and third story, or into a closed tank.

The Curtis balanced trap is also often used as a water-line trap on large plants, when there is need to balance any particular circulation, to prevent snapping and cracking in the pipes and radiators. This is accomplished by connecting the direct steam pipe to the top of the trap, and bringing in the return below the water line of the trap.

The Griswoldville Explosion.

Finishing the years' record of disasters in New England, December added another boiler explosion to the list. The scene of this last catastrophe was at Griswoldville, in the western part of Massachusetts, in the No. 2 mill of the Griswoldville Cotton Manufacturing Co.

Conected with this mill was a brick extension in which was located two 100 h. p. boilers which were used for heating purposes and to furnish steam power to help out the water wheels. At this time but one boiler was in use, the other being laid off. In addition to containing the boiler-room, the building was used for a blacksmith's shop, warp dressing room, a cotton and coal storing shed and machine shop.

On December 29th the plant was shut down at six P. M. as usual, the boilers were filled with water for the night, the fires banked, and left in charge of a night fireman, Fred Scheiffler, who was also night watchman.

The mill operatives had all left the factory and so far as known, the watchman had been in charge a little over an hour, when the town was startled by a terrific explosion, which was heard for several miles.

In a short time a large crowd had gathered about the mills, and found the brick extension in ruins. No fire followed the explosion and search was immediately commenced for the cause of the wreck, and to find, if possible the missing watchman.

In clearing up a section of the wreck the rescuers made their way into the machine shop, but were unable to find any trace of the watchman until after a long search, his mangled body was discovered under the ruins of the western wall just outside of the building.

Further investigation showed that the boiler had given way, the tubes in one sheet being found near the setting and the greater part of the shell carried some 250 feet east, while another section was deposited in the river near the mill.

The boiler had been inspected a few days previous to the accident and was considered in good condition.

As usual, just what caused the break will remain a mystery. The watchman's clock found after the explosion, indicated that he had made the seven o'clock trip through the mill and returned to the machine shop, adjoining the boiler room, which showed that the boiler had without doubt received his attention but a very few moments before the break.

Among other theories advanced as to a probable cause, was that the pressure might have run up and the boiler, being full of water, the blowing of the safety-valve caused an immense water hammer, too great for the boiler to stand.

No blame is attached to the watchman, as he had been in the company's employ for about ten years, and was considered a thoroughly reliable and competent man.

The company also have the reputation of being very careful in seeing that all safe-guards necessary to the protection of life and property are taken. An evidence of this is seen by the fact that during the seventy years which have elapsed since the mill was first started by Jos. Griswold, Sr., this is the first fatal accident that has occurred.

That the boiler was built from specifications furnished by the Hartford Boiler Ins. Co. is a guarantee that it was of first-class construction, and the safety appliances at the last

inspection were found to be in excellent condition. It follows therefore that this disaster must take its place in the already long list of mysterious boiler explosions.

—A German has patented a method of stiffening hats as follows: The hats are stiffened with the ordinary shellac liquor in the usual way, then sandpapered; they are then treated on the

GRISWOLDVILLE MILL AFTER EXPLOSION.

THE EXPLODED BOILER.

—Very little reliable knowledge has come down to modern times regarding the textile arts of Ancient Britain.

inside with a white shellac soap liquor which may be colored with an alcohol soluble dyestuff, such as nigrosine.

The Calico Printing Industry.

M. Schoen, a well-known French authority, has compiled the following statistics relating to the calico printing industry of the world. The number of printworks is 314, distributed as follows:

Great Britain	79
Russia	29
United States	42
Austria	36
France	34
Alsace-Lorraine	11
Germany	14
Spain	31
Italy	15
Holland	6
Mexico	10
Switzerland	4
Belgium	3

From this it will be seen that Great Britain is above other countries in the number of printworks it possesses, the United States coming second. M. Schoen gives the number of machines as 2,686, distributed as follows:

Great Britain	888
Russia	412
United States	389
Austria	225
France	197
Alsace-Lorraine	152
Germany	150
Spain	94
Italy	87
Holland	27
Mexico	27
Switzerland	20
Belgium	18

Here again Great Britain occupies the premier position, having more than twice as many machines as any of its competitors, Russia coming second, and the United States occupying the third place. The "Textile Mercury," of England, does not accept M. Schoen's figures as strictly accurate, those relating to Great Britain being, it believes, much below the mark. His comparisons, however are interesting.

Comparing the average number of machines in the works, it will be seen that the Russian printworks must be relatively larger than British works, as they have an average of 14.2 machines. The celebrated Alsatian printworks are also larger (13.6 machines per works). On the other hand, British works have an average of 11.2 machines per works, while American printworks are smaller, as they only average 9.2 machines.

The production of printed pieces is given at 45,882,000, distributed as follows:

Great Britain	15,984,000
Russia	9,064,000
United States	7,780,000
Austria	3,375,000
France	2,364,000
Alsace-Lorraine	912,000
Germany	2,250,000
Spain	1,128,000
Italy	1,740,000
Holland	270,000
Mexico	675,000
Switzerland	160,000
Belgium	180,000

The following table shows the quantity produced by each machine in the different countries:—

Great Britain	18,000
Russia	22,000
United States	20,000
Austria	15,000
France	12,000
Alsace-Lorraine	6,000
Germany	15,000
Spain	12,000
Italy	20,000
Holland	10,000
Mexico	25,000
Switzerland	8,000
Belgium	10,000

We have here the astonishing facts, according to M. Schoen, that the most productive machines are in Mexico, the least productive in Alsace, while as regards Great Britain a machine turns out three times the number of pieces produced in Alsace. This is due to the longer runs of a design in England. While on the average a run in England may be taken as 100 pieces, in Alsace it is only about 30, and much time is lost in changing a machine from one design to another. America turns out more pieces per machine than England, as does also Russia, which is a good second to Mexico in its machine output. Italy also has a large output.

—The English manufacturers and merchants hold the markets of the world not by looking at things from a superficial point of view, but from the standpoint that where there is business they must have it, by putting in operation only what are practical and common sense business methods.

COLORS AND DYEING.

Dye Recipes for March.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 33.

Medium Blue on Cotton Yarn.

Diamineral Blue R on 100 pounds cotton yarn.

Prepare dyebath with

1½ lbs. Diamineral Blue R.
(Wm. J. Matheson & Co., 178 Front St., New York.)
2 lbs. Sal Soda.
20 lbs. Glauber's Salt.

Enter in yarn at boil, and turn one hour at that heat, and top off in a second bath with

1½ lbs. Sulphate of Copper.
1 lb. Bichromate of Potash.
½ lb. Acetic Acid.

Turn one-half hour at 160 to 180 deg. F. Rinse.

An extremely fast shade of blue is obtained by an after treatment in a chrome and sulphate of copper bath. Fine and fast indigo shades are produced at a very low cost. (See recipe 28 in the February Supplement for a medium blue on cotton.)

RECIPE NO. 34.

Reddish Brown on Cotton Yarn.

Direct Brown R on 100 pounds cotton yarn.

Prepare dyebath with

3 lbs. Direct Brown R.
(Sykes & Street, 85 Water St., New York.)
20 lbs. Common Salt.

Enter in yarn at boil and turn one hour at that heat.

Direct Brown R, like Direct Brown J, (see recipe in this issue No. 37), is a very soluble color, and will combine with other direct dyes for shading. The shade here shown is of a reddish cast that is very popular, and when combined with direct reds, fine shades of wine, maroons and garnets can be produced. Less color can be used in succeeding baths.

RECIPE NO. 35.

Medium Blue on Worsted Yarn.

Wool Blue S S on 100 pounds worsted yarn.

Prepare dye bath with

3 lbs. Wool Blue S S.
(John J. Keller & Co., 104 Murray St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120° F.; bring to boil while turning, and turn to shade at that heat.

Wool Blue S S is very well adapted for dyeing wool, and as it produces a cheap and fast blue in one dip, dyers can use it to advantage. It is used not only for a blue, in itself, but will combine with other acid dyes for producing other shades. It is fast. (See recipe 22 in February Supplement.)

RECIPE NO. 36.

Black on Wool Cheviot Cloth.

Logwood and Fustic on 220 pounds wool cheviot cloth.

Mordant for 1 1-2 hours with

6 lbs. Bichromate of Potash.
1 lb. Blue Vitriol.
¼ lb. Sulphuric Acid.

Wash and dye in a bath with

26 lbs. Solid Logwood Extract N.
3 lbs. Fustic Liquor L.
(Stamford Mfg. Co., 133 Front St., New York.)

Enter in cloth at 160° F., bring to a boil while turning, and turn 1 1-2 hours at that heat.

Logwood Extract N and Fustic Liquor L are both well known extracts on the

market. They are largely used on account of their strength and pureness. They produce together very fine shades of blacks, working well with alizarines. (See recipes 71, 72, 124 and 134, in 1897 Supplement, for shades of plum, green and olive.)

RECIPE NO. 37.

Orange Brown on Cotton Yarn.

Direct Brown J on 100 pounds cotton yarn.

Prepare dye bath with

3 lbs. Direct Brown J.
(Sykes & Street, 85 Water St., New York.)

20 lbs. Common Salt.

Enter in yarn at boil, and turn one hour at that heat.

Direct Brown J dyes a brown of a yellow cast, and can be used with other direct colors for producing different shades of browns and other colors. It is very soluble and dyes perfectly level. For standing baths, less color is used. (See recipe 34 in this issue, where Direct Brown R is used).

RECIPE NO. 38.

Purple on Worsted Yarn.

Acid Blue A A on 100 pounds worsted yarn.

Prepare dye bath with

1¼ lbs. Acid Blue A A.
(John J. Keller & Co., 104 Murray St., New York.)

3 lbs. Sulphuric Acid.

10 lbs. Glauber's Salt.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

Acid Blue A A produces a fine shade of blue, and as the color does not rub off, and works level, it will be found to be an excellent dye for combining with other acid dyes and extracts; as it is a cheap color, it will be an object for dyers to try it.

RECIPE NO. 39.

Brown on Cotton Knit Goods.

Direct Brown 5095 on 100 pounds of cotton knit goods.

Prepare dye bath with, to start

2½ lbs. Direct Brown 5095.
(Stone & Ware Co., 157 Maiden Lane, New York City.)

15 lbs. Common Salt.

Enter in cloth at boil, and run one hour at that heat. For standing kettle, use

1½ to 1¾ lbs. of Brown.

Direct Brown 5095, being a direct dye, will combine with other direct dyes. It produces not only a full and bright shade of brown, but a fast color, and like Direct Navy Blue 5096 (see recipe 40 this issue) will be found to be very useful for hosiery piece goods, cotton, yarn, etc.

RECIPE NO. 40.

Dark Blue on Cotton Knit Goods.

Direct Navy Blue on 100 pounds cotton knit goods.

Prepare dye bath with, to start

4 lbs. Direct Navy Blue 5096.
(The Stone & Ware Co., 157 Maiden Land, New York).

15 lbs. Common Salt.

Enter in cloth at boil, and run one hour at that heat.

Direct Navy Blue 5096 dyes a full, fine shade of a deep navy blue, in one dip, producing a fast, cheap and level dyeing. For standing kettle, one-third less color can be used.

RECIPE NO. 41.

Green on Wool Flannel.

Dark Green E. B. on 100 pounds wool flannel.

Prepare dye bath with

5 lbs. Alizarine Green E. B.
(C. Bischoff & Co., 87 Park Place, New York.)

Enter in cloth at 100° F., bring to boil while turning, and turn one hour at that heat. Then add

8 lbs. Acetic Acid.

Turn at boil till bath is exhausted.

The dye is first dissolved in ammonia, of which three to five pounds should be used for each pound of dye. Make a paste first, then pour boiling water on it till it is thoroughly dissolved.

Alizarine Green E B is a fast color, and for a direct green it does splendid work. It can also be dyed on a chrome

mordant. The color is perfectly fast to washing, and will not rub off.

RECIPE NO. 42.

Red on Wool Yarn.

Titan Red on 100 pounds wool yarn.

Prepare dyebath with

1¼ lbs. Titan Red.
(Read Holliday & Sons, Ltd., 100 William St., New York.)

3 lbs. Acetic Acid.

Enter in yarn at 120 deg. F.; bring to boil while turning, and turn to shade at that heat.

Titan Red, when dyed on wool, will be found to work on the fibre slowly, thus giving level shades. The Titan Red dissolves readily in hot water, and produces very fast shades, giving a fine, brilliant appearance. It does not bleed or rub off.

RECIPE NO. 43.

Medium Blue on Cotton Flannel.

Alizarine Blue D G on 100 pounds cotton flannel.

Prepare dye bath with

2 lbs. Alizarine Blue D G.
(Victor Koechl & Co., 79 Murray St., New York.)

50 lbs. Common Salt.

2 lbs. Sal Ammoniac.

Enter in cloth at 110° F., bring to boil while turning, and turn 45 minutes at that heat. Rinse and enter a fresh bath to which

3 lbs. Blue Vitriol

has been added. Turn 20 to 30 minutes at 150 deg. F.

When Alizarine Blue D G is after treated in a chrome or blue vitriol bath, exceedingly fast shades are produced. The shade of blue becomes changed by this treatment. (See recipe 179 in last December's Supplement for a medium blue on cotton.)

RECIPE NO. 44.

Red Violet on Worsted Yarn.

Acid Violet 118 on 100 pounds worsted yarn.

Prepare dye bath with

2 lbs. Acid Violet 118.
(The Hanna Schoellkopf Co., 135 No. Water St., Philadelphia.)

10 lbs. Glauber's Salt.

4 lbs. Sulphuric Acid.

Enter in yarn at 120° F. Bring to boil while turning, and turn one hour at that heat.

Acid Violet, like Acid Blue (see recipe 24), is a strong and concentrated dye, and has all the good qualities of the latter. These dyes combine very well, and produce fine shades of dark and navy blues.

RECIPE NO. 45.

Bright Red on Cotton Yarn.

Brilliant Red D on 100 pounds cotton yarn.

Prepare dyebath with

1¼ lbs. Brilliant Red D.
(A. Klipstein & Co., 122 Pearl St., New York.)

10 lbs. Glauber's Salt.

Enter yarn in dye bath at boil, and turn one hour at that heat. Then allow the bath to cool down for one-half hour, while turning slowly.

Brilliant Red D is a new direct dye for cotton, and will be found to be a fine dye, and very easily worked. The dye goes on very slowly, and works perfectly level. The color it produces is of a brilliant and rich cast, and fast.

RECIPE NO. 46.

Slate on Cotton Knit Goods.

Pluto Black G on 100 pounds cotton knit goods.

Prepare dye bath with

6 oz. Pluto Black G.
(Farbenfabriken of Elberfeld Co., 77 William St., New York.)

8 lbs. Glauber's Salt.

1 lb. Sal soda.

Enter in cloth at 140 deg. F.; bring to boil while turning, and turn one hour at that heat.

Fine shades of grays and slates can be dyed by using small quantities of Pluto Black G. It also dyes a fine, deep, rich shade of black in one dip, at a very small cost. (See recipe 175 in 1897 Supplement, on the same kind of goods).

RECIPE NO. 47.

Red on Worsted Yarn.

Brilliant Bordeaux S on 100 pounds worsted yarn.

Prepare dyebath with

1 lb Brilliant Bordeaux S.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
3 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120° F. Bring up to boil while turning, and turn to shade at that heat.

Brilliant Bordeaux S is a new color, and the shades produced by it are very brilliant and rich. The color works very level and slowly on the fibre, penetrating the thickest cloth. It is fast against light and alkalies. It also gives a very fine shade on silk.

RECIPE NO. 48.

Blue Black on Mixed Yarn.

Blue 77 G on 100 pounds yarn (60 per cent. cotton and 40 per cent wool).

Prepare dye bath with

2 lbs. Blue 77 G.
(Anchor Color Mfg. Co., 462 Cherry St., New York.)
25 lbs. Glauber's Salt.
4 lbs. Borax.

Enter in yarn at 120 deg. F.; bring to boil while turning, and turn one hour at that heat. Then shut off steam and turn slowly for one-half hour longer, without the steam being turned on.

For dyeing mixed cotton and wool, Blue 77 G is very well adapted. It produces the same shade on both fibres in one dip, and the cost is very low. The color shown here will be found to be fast. (See recipes 107 and 123 in the 1897 Supplement).

New Dyes.

We present a number of new dyes to our readers, in the recipes that appear in this issue.

Sykes & Street, New York, have represented in recipes 34 and 37, two dyes known as Direct Brown R and Direct Brown J, for the production of a reddish brown and an orange brown respectively, on cotton yarn. These products are fairly fast to washing, and quite fast to light. We refer to our dyer's comments concerning them.

In recipe 36, we think our many readers will be interested in the combination of Logwood and Fustic Extracts, furnished by the Stamford Mfg. Co., New York. The production of a good black on a low grade cloth is just what is wanted in some of our mills.

A handsome purple on worsted yarn may be seen in recipe 38, obtained from the use of Acid Blue A A, furnished by John J. Keller & Co., New York. This dye is used in the identical manner as the other acid blues furnished by this house, and which have been exhibited in previous recipes.

The Stone & Ware Co., New York, show two excellent dyes in this issue, one in recipe 39 (Direct Brown 5095), for the production of a brown on cotton knit goods, and one in recipe 40 (Direct Navy Blue 5096), for the production of a dark blue on cotton yarn. These dyes possess the properties of going immediately on the yarn piece goods, or on cotton, in one bath, giving full, dark shades, and absolutely fast, at a low cost.

We think our readers will be interested in the green on wool flannel, noticed in recipe 41, obtained from the use of Alizarine Green E B, furnished by C. Bischoff & Co., New York. Our dyer's comments in reference to this dye may be read to advantage. The shades obtained from this dye are absolutely fast to sunlight and to fulling. In this recipe, our dyer has made use of ammonia, but if no ammonia is used for dissolving the color, it will, to a certain extent, dissolve in the dye tub, but may cause spots on the goods. Although by this way it will turn out much brighter, but only half strength. As stated by our dyer, this dye may also be used on a chrome bottom, and combine with any of the alizarines, but some acetic acid will have to be used invariably.

The use of Titan Red in recipe 42, for a red on woolen yarn, furnished by Read Holliday & Sons, New York, should attract attention. This dye is

one of the direct cotton reds supplied by this house, dying a blue shade of pink or red, according to the amount of dyestuff used from salt baths. It is especially useful for dyeing wool, yielding a bright, bluish shade, when dyed with acetic acid, as per the recipe given in this issue. The color produced is fast, and should prove very useful to the wool dyer.

We think that the receivers of our Dyers' Supplement will be attracted to the red violet on worsted yarn, seen in recipe 44, produced from acid violet 118, furnished by the Hanna-Schoellkopf Co., Philadelphia. This color is simply an acid violet which can be used in combination for cardinals, wines, etc.

The effect of Brilliant Red D, furnished by A. Klipstein & Co., New York, in recipe 45, for the production of a bright red on cotton yarn, is especially good, and our dyer's comments are of value to those who make use of it. The chief point of value of this dye is its non-sensitiveness to acids, and its extreme fastness to light.

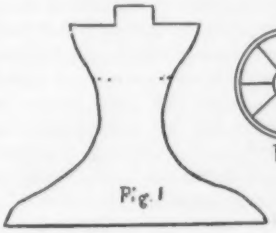
The New York & Boston Dyewood Co., New York, have furnished a very effectual dye in their Brilliant Bordeaux S, in the production of a red on worsted yarn, seen in recipe 47. This dye was introduced upon the market last summer, as a new acid coloring matter for wool, possessing the advantages of a level dyeing red for dark shades, yielding very even dyeings. Being very easily soluble, it is very slowly and evenly absorbed by the fibre, from an acid bath, and yields intense bluish red shades. As is the case with most level dyeing acid colors, the baths are not completely exhausted. The fastness to alkalies and acids and stoving is perfect. Silk is dyed with it in a broken, boiled-off liquor bath. It finds advantageous application in wool printing.

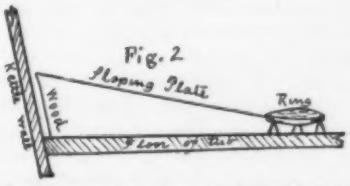
—Commercial enterprise has become a national policy with foreign countries, and who will say that it ought not to be encouraged by the American government, whose consuls should be made more useful than they have been.

Tubs and False Bottoms.

I have often had to replace existing wooden "false-bottoms" in dye room kettles; and wherever possible have done so with iron ones. The instances in which they cannot be used to great and lasting advantage, are few and far between. If a dye tub is worth building, it is worth building well, fitly framed together. It also pays to put in the best kind of bottom. It is surprising to see kettles not only put together of plank, a full inch too thin for the purpose, but with bottoms that are a nuisance from first to last.

When I was a boy, the kettles then in use for raw stock dyeing were either of copper or iron, cauldrons with brick foundation and fireplace, and flues beneath and around. The bottoms of these were bowl shaped in-





side as was also the perforated false bottom within. These, of course, having served their day and generation, are of the past. However, our friends tinctorial, in Scotland and in Canada, know a thing or two, and have taken an idea from these by-gone "boilers" as they were called. The thought to my mind is a very happy one, and for twenty years I have continued to profit by it. They make their false bottoms in a similar fashion. As these are a good thing, and not so generally known as they should be, I shall here try to briefly describe them for the readers of this magazine.

Suppose you are providing for a large tub, seven feet across, and four

and a half feet deep, inside measurement, a common size in mills of average capacity. Get some narrow, inch thick, planed, pine boards, saw them off into seven inch or eight inch lengths. Nail these side by side all around the inner circumference of your tub, tight down to the bottom, and to each other. This will form a circular support for the outer rim of your new false bottom, clean and strong. Use copper, zinc, or good clout nails.

But wait a second; perhaps I should forewarn you of one thing that your carpenter and yourself may forget, as I did once. It is better that I should retrace my steps than to leave it out. What I wish to emphasize, as preliminary to even what I have already described, is this: be sure to get your kettle into a circular shape, at the bottom at least, first of all. Don't fancy that because the bottom of it has been lined out with a pair of trammel points, and worked true to circle afterwards that the tub must be round. That by no means follows. When the hoops are drawn or driven, they do not invariably pull the chime in the staves snugly over the rim of the bottom with equal tightness in every place. So, I repeat, get it quite round, and prove it so by measurements.

You will next strike a circle of twenty to twenty-two inches in diameter, exactly in the center of the floor of the kettle. Have your millwright make a pattern from which to mould a cast iron ring to stand on short legs where this circle comes. This ring will need to be about 1⅛ to 1¼ inches wide on its upper surface, about an inch thick, and rounded on the bottom side. You understand that it will lie horizontally on its feet. These last must be about six in number, cast into the ring of one piece, and flaring at the lower end so as to rest flat and securely. They ought to raise the upper surface of the ring not much over three inches from the floor, or bottom proper, of the kettle. A rough diagram, Fig. 1, of the ring, cut through the middle of one of its feet, is herewith shown.

You will notice the quarter inch square ridge along the top of the ring. Its use will appear as I proceed. The dotted line shows the shape of the ring between the supporting feet. When made, this ring will sit quite solid on the flat-footed, stubby supports without screw or fastening, fairly in the middle of the tub's bottom on top. Let me explain its purpose now.

Iron plates are to be cast a quarter of an inch, or 5-16 in. thick, which will extend from the inside walls of the tub to the ring I have mentioned, as shown in Fig. 2. The plates are cast in segmentary divisions of the intervening space (Fig. 3). Each plate section ought to be about sixteen inches wide at the widest end, proportionately narrower at the other. The open space in the ring will be filled with two semi-circular plates, which will now complete the false bottom. The ridge on the face of the ring keeps all in place. The plates are perforated with 1-16 inch holes, an inch apart, in rows two inches apart from each other. The regularity of the perforations is broken, as masons break joints in their work. The holes in the outer plates do not start till you get eight or ten inches away from the walls of the tub. Along the straight side edge of one of the center, and of each of the other plates, is placed a ⅞ in. strip thrown out half of its width over the edge so as to form a shelf for the edge of the adjoining plate to rest upon. This may be of about the thickness of the plates themselves, and rounded off neatly on the under side like the ring. The strips are of course placed on the pattern, and cast upon the plates.

If the foregoing description has been sufficiently lucid, it will be understood from this that the result is a clean, strong, and lasting saucer-shaped, false-bottom, on which the stock always boils just right, and drains freely when done, and which makes poleing easier and more certain. The overlapping plates are secured only by their own weight, so that by lifting a couple of them at any time, the steam pipe may be examined, or the space between the bottoms cleaned out, without trouble or damage to the ket-

tle. A screen bottom of this sort never breaks, or splinters, or clogs, like a wooden one, and with ordinary care it will last a generation. A well made, well hooped tub of this sort, built of sound three-inch staff, with bottom like this, will be found to be practically indestructable, and will outwear several of the type usually met with in dyehouses throughout the country. Allow me to commend it to your notice. J. C.

Hat Dyeing.

The hat dyer has a peculiar fabric to deal with, felt, the mere mechanical construction of which interposes many difficulties in the way of obtaining perfect results in dyeing. Then there are the difficulties brought about by the character of the fur and wool fibres which are employed in the formation of hats. All the various kinds of wools, furs of rabbit, hare, etc., are used and while all these consist essentially of the same substance, yet the structure of each fibre is so different that it gives rise to varying affinities for the different dyestuffs and coloring matters. Hence if they are mixed together, as they are frequently in the formation of a hat, the difficulties of the dyer in the way of producing a perfectly level and uniform color on the hat are materially increased. Wool fibres, being more open in structure, are much easier to dye than fur fibres and greater penetration is effected on wool than on fur hats.

Hat bodies are usually dyed in large copper kettles about 3 ft. 6 in. to 4 ft. across and 24 to 30 inches deep, heated by steam. In some pans the steam pipe is carried round the bottom corner of the kettle, but a better plan is to put in a perforated false bottom about 5 to 6 inches above the actual bottom and run the steam pipe in a zig-zag manner in the space between the two bottoms. During the operation the hats are worked about by paddles. Mechanical dyeing machines have not come into much use for the dyeing of hats.

Stiffened hats are more difficult to deal with in hand dyeing, while a machine has yet to be made which will work with success in the dyeing of stiffened hats. As regards the stiffening of hats, it may be remarked that the stiffening adds materially to the trouble of dyeing by preventing the proper penetration of the dyestuff into the substance of the hat body. This is a difficulty which is met with to a greater extent with certain dyes than with others. It is well worth the while of hat dyers to consider whether it is not worth while to stiffen after dyeing instead of before it. It can be and is done in many cases with good results. The hat dyer in working with stiffened hats will find that the best results are obtained when dyestuffs are used which are soluble in water, as their penetrative powers are greatest when such dyes as alizarine, gambier, etc., that are insoluble in water, or whose dyeing properties depend upon their forming insoluble color-lakes with metallic mordants, are used; then the hat felt acts as a filter, and retains the coloring matter or the color-lake on the surface, and prevents it from penetrating below into the centre of the hat felt. Here then comes in a hindrance or difficulty in hat-dyeing due to the operation of two causes of a physical nature, the structure of the hat felt, on the one hand, and the character of the dyestuffs or coloring matters on the other. The only way of overcoming this difficulty is by recognizing the causes and taking steps accordingly; we shall see later on how this may be done.

It is a notable fact that the affinity of animal fibres like wool and fur, for dyestuffs, is greatest at the boil and least at ordinary temperatures; the dyer must take advantage of this property in carrying out his dyeing operations. If he desires uniform, level shades, which have penetrated well throughout the fibre, he must not enter his goods into a boiling bath, but into a cold or only lukewarm bath, keeping at that temperature for some time, then slowly raising up to the boil. It is not needful to boil furiously, a gentle boil is sufficient; this

gives time for the fixation of the dyestuff on the fibre, and particularly so in hat-dyeing, rather than a short furious boil. At the boil the wool or fur fixes the dyestuff firmly; hence the necessity of the dye bath being at the boiling heat or near that heat, say from 200° to 212° F. The duration of the dyeing, after the boil has been attained, should be about one hour to an hour and a half, while to reach the boil, from half to even an hour should be allowed. The hat dyer makes use of both natural and artificial dyestuffs, the latter at the expense of the former. The dyes which are in use for hat dyeing divide themselves into two divisions: all those acid and azo colors which are dyed from acid baths, and secondly, those which require a metallic mordant to enable them to develop and fix the color on the fibre; that is to say, the mordant dyes.

As far as regards the basic dyes, it is doubtful if ever they will be used, for they lack two necessary elements that all hat dyes must possess—the capability of withstanding the finishing process through which the hat passes after it has been dyed, and the want of resistance to light and air when in use. The direct dyes dye wool very well, and they have an advantage in that they will dye any bits of cotton that may be mingled with the wool or fur fibres. Their capabilities for hat dyeing, however, have yet to be demonstrated. Some few of them which possess good wearing properties are worth a trial, but there are others that cannot possibly be used owing to their want of fastness.—[The Dyer and Calico Printer.

Artificial Silk.

Artificial silk, which is produced in the well known manner from cellulose, has not been brought into such general use as had been expected. This is mainly due to its behavior in the presence of water. In its wet state it loses about 90 per cent. of strength, and this property, apart from the drawbacks occasioned by this fact in the practical utilization of the silk, also renders the further treatment, especially the dyeing, considerably more difficult.

A process has recently been invented abroad for removing the so-called hygroscopicity of artificial silk, that is to say, its tendency to absorb water. This consists in adding to the solvent for the nitrocellulose, formic aldehyde, acetic aldehyde, paraldehyde, benzaldehyde, or other substances belonging to the same group, or in treating the drawn-out thread with a solution of such substances. The quantity of formic aldehyde which is to be mixed with the solvent, or with the agent required for treating the finished spun thread before its denitration, may amount to as much as 15 per cent. of the weight of the nitrocellulose.

As formic aldehyde, or the above-mentioned equivalents in combination with ethyl alcohol or methyl alcohol, ether, etc., constitute an extremely effective solvent for nitrocellulose, it is most advantageous to add and mix the formic aldehyde at the very commencement of the treatment of the nitrocellulose.

—For the production of moire effects on crimpes the following process has been patented abroad:—Print a suitable cloth in narrow stripes, 3—6 threads wide and about the same distance apart, in black or colors, using one or several rollers. Again pass through the machine, using with the same rollers a crimping reserve of known constitution, white or color, whilst the cloth on entering the machine is alternately moved to the right or left, so as to effect an irregular crossing of the two sets of stripes. Afterwards pass through caustic soda, and when sufficiently crimped, wash off and dry. Instead of producing the stripes to be crimped by printing, they may also be woven, and in either case they may be superposed to any kind of woven or printed design.

--The fundamental purpose of the Lowell Textile School is the promotion of manufactures, and very much to this purpose is expected of the best men who shall graduate after having gathered the full preparation which the school can give.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Sheep, Etc. in England.

Editor Textile World:

Will you please give me the number of sheep in England, and also the fluctuations in the price of 60s Botany tops, since 1890.

Lowell. F. H.

The number of sheep and lambs in England in 1896 was 30,786,023, and the total wool production was 174,939,356 pounds, including 36,281,916 pounds of pulled wool, making the net clip of wool for 1897, 138,657,440 pounds. The production was obtained from the sheep and lambs of 1896. The price of 60s Botany tops in January, 1890, was 29d. The decline in price of this product commenced in the preceding month, and continued until April, 1892, when the price remained without much change until the last quarter of 1894, when another decline took place, till 16-1/2d. was touched, in June of 1895, when a quick advance was made till it reached 22-1/2d., in September of that year, when there was a reaction, with frequent fluctuations, until the middle of 1897, when a decidedly upward turn took place to 20-1/2d., at which figure it closed the year.

Infants' Underwear in the South.

Editor Textile World:

Will you kindly give me a list of some of the manufacturers in the South, who make infants' underwear, and oblige

Bridgeport.

We are aware of only one or two mills in the South making this line of goods, and have given you their address by mail. There are comparatively few knitting mills in the South, although their number is constantly increasing. Most of these mills, manufacture seamless cotton hosiery, although there are quite a number now making underwear with good success.

Pulled Wool.

Editor Textile World:

Can you furnish me any reliable data upon which to estimate the production of pulled wool in this country?

Rhode Island. W. B.

We know of no such data, nor do we know how to secure it, unless every pulling establishment in the country is written to and the necessary statistics obtained from such sources. This would involve a great deal of labor, and in many instances the information would not be forthcoming. The post-mortem inspection of the Bureau of Animal Industry, Department of Agriculture, Washington, for 1897, was 5,213,894 sheep. Of course, this was much below the actual number of sheep slaughtered from whose pelts wool was pulled. This was the number of sheep inspected and entered into consumption. The total number of sheep that were slaughtered in 1897 was probably somewhere between eight and twelve million, which would give the total production of pulled wool, on the basis of 4-1/2 pounds per pelt, which at a fair estimate, is about forty million pounds. This accords with the estimates of the National Association of Wool Manufacturers.

Cotton Spindles in Great Britain.

Editor Textile World:

Will you give me the number of cotton spindles in Great Britain, and if there has been any additions to the cotton spinning capacity of that country within the last ten years.

Maine. O. L. H.

According to this year's edition of Worrall's cotton spinners' and manufacturers' directory, the number of spindles, which we understand to include spinning and doubling, in 1898, is 41,795,731, apportioned among 1,735 firms. In 1887-88 the number of spindles was 40,946,709 apportioned among 1778 firms. We might add that in 1896 the number of spindles was 43,186,657. It will be seen from this that there has been a decline in the since 1896, when it reached its high water spinning capacity of Great Britain mark.

Water-Proofing and Textile Works.

Editor Textile World:

Can you give me the name and address of a manufacturer of improved machines for tipping shoe lacings? Do you know of any publication on the subject of water-proofing linen and cotton goods? Where can the best miscellaneous collection of textile publications be had?

Connecticut. F. W. K.

We would suggest writing to Brooks & Co., 97 Summer St., Boston, concerning a machine for tipping shoe laces. There

is no work especially on the subject of water-proofing of fabrics. Articles of this character have appeared from time to time in this magazine, and are occasionally to be found in works on finishing and dyeing. Fabrics of linen and cotton can be rendered water-proof by saturating them with a solution of gum or gelatine, containing from 1/10 to 1/50 of bichromate of potash, and then exposing them to sunlight. There is an excellent water-proofing process patented in England, No. 22,197 (1896). The gelatine becomes insoluble and firmly fixed to the cloth. There is no one place where a miscellaneous collection of textile books can be obtained. We would suggest following our book notices that appear monthly in this magazine, and also our special list of textile books that we publish each month.

Yarn Printing Machine.

Editor Textile World:

Will you please give me information about a machine for printing yarn like the enclosed sample. Where can we buy such machines? I understand this yarn is printed in the hanks. Yours truly.

Elastic.

We do not remember to have seen a machine for printing cotton yarn like your sample, in hanks. The yarn printing that we have in mind is such as is done on carpet warps, the warps being passed from one beam to another, stretched tightly over a segment of the surface of a large revolving drum, across the face of which a printing roller travels diagonally back and forth, the roller being supplied by a feeder. You probably have some other system in mind. Yarn printing machines can be purchased from the Phenix Iron Foundry, Providence, R. I.; Charles A. Luther & Co., Pawtucket, R. I.; and George C Howard, 17 South 18th St., Philadelphia. We would suggest your corresponding with them, and also with Birch Bros., Somerville, Mass.

Book on Dyeing.

Editor Textile World:

Do you publish a book on dyeing?

New Hampshire. F. J. H.

We do not, ourselves, publish such a work, but if our correspondent will turn to page 125, February issue, he will find a list of textile books, including two on dyeing. These we can recommend. There is a most excellent work entitled "Dyeing of Textile Fabrics," by J. J. Hummel, published a few years ago, but good even at this date, which we can recommend. Price $2.00.

Paper Yarn.

Editor Textile World:

Some time ago, we noticed a reference about paper yarn and twine, in your valuable magazine. Can you kindly inform us who the makers are, and oblige a regular subscriber?

Broome.

We would refer you to page 98 of June, '97 number of the Textile World, where this subject was treated at some length.

Mercerised Cotton.

Editor Textile World:

What is mercerising cotton yarn? What effect has it on the fibre? What process is generally used?

Maryland. M. B. D.

The mercerising of cotton means subjecting it to the action of strong caustic soda. When cotton is subjected to a treatment with a solution of caustic soda at a specific gravity of 1.3 to 1.4, it becomes stronger, but the additional strength is due to the shrinkage of the fibre in length, and its increase in thickness. We do not know of any process, about which it can be said is in general use. There are various processes. We should say a very good one is given in our February issue, page 94. The writer of the article referred to is an old experienced chemist. In nearly every issue of this magazine, some reference is made to one or another processes.

Cotton Elder Down.

Editor Textile World:

Do you know of mills that manufacture cotton elder down, besides the H. H. Bell Co., Milton, N. Y. If so, will you kindly send us the names? Yours truly,

Pioneer.

We would refer you to the Franklin Knitting Co., Franklin, Mass., or C. B. Fillebrown & Co., agents for the Glenark Mills. We believe these concerns could supply such goods, although they do more in wool elder down and stockinettes.

Re-fluting Rolls.

Editor Textile World:

Will you inform us if there is a machine made suitable for re-fluting spinning frame rolls, and if so who makes such a machine?

H. G.

We believe that there is an attachment to a planing machine which accomplishes this purpose, but we do not know by whom it is made. We had thought it was made by Pratt & Whitney, but it seems not. Should this reach the eye of

someone who knows of this device, we should be glad to hear of it. We presume that concerns that make fluted rolls, are also equipped for re-fluting them, and in this connection we mention the Cohoes Foundry & Machine Co., Cohoes, N. Y., and A. G. Thurston & Son, Fall River, Mass.

Skirted Wool.

Editor Textile World:

Will you please give me an idea of what "skirtings" mean from a fleece of wool, as practiced, for instance, in Australia?

New York. G. M. C.

We have had more or less to say about this subject in our columns, but we will add that the method generally followed in Australian colonies of classing and skirting fleeces is as follows: The belly wool is shorn off first and thrown one side, to be picked up by boys, and kept by itself. The remainder of the fleece is then shorn and thrown out on a table, where it is skirted, then rolled up and passed on to the classer who places it in a bin with others of the class to which it belongs. The skirtings are then sorted into two or more lots. After a sheep is shorn, all locks, etc., are swept up from the shearing floor before a fresh sheep is brought out to be shorn. The fleeces are not skirted with special reference to the American trade, nor has this been done in the past. No definite proportion is skirted off, the quantity being regulated by the condition of the fleeces; burry, seedy, matted, discolored and shabby portions being removed. The skirtings are commonly divided into 1st, 2nd and stained pieces; the 1st pieces being, in some cases, called "broken fleece."

Southern Mill Stock.

Editor Textile World:

Will you please give me the address of a few brokers handling Southern mill stocks? —Beard.

Write to Colin M. Hawkins & Co., Raleigh, N. C.

Book on Wool Carding.

Editor Textile World:

Will you be so kind as to inform me where I can obtain the best works on wool carding, on this subject alone.

New York. C. H. E.

There is no special work on this subject, except one by Bramwell, published a number of years ago, suitable for American machinery. This book is somewhat out of date, still it is a good one, and contains much useful information. There are two good books on woolen manufacture, published in England, one by Roberts Beaumont, price $2.50, and the other by Charles Vickerman, price $1.75.

Mill Seconds, Mill Ends and Jobs.

Editor Textile World:

Can you inform me where I can get mill seconds, mill ends and jobs in dry goods, hosiery, etc., to sell on commission? I am a commission agent and want these goods for a large trade in Chicago and throughout the West. I would handle them direct from the mills or through a reliable jobber making a specialty of this class of trade.

James G. Stokes.
Methuah Building, Chicago.

Can anyone satisfy this inquiry?

Carbonizing Wool.

Editor Textile World:

I understand that the principal chemical used in the carbonizing of wool is sulphuric acid. I suppose that this is generally, or universally, used. Is such the case?

Massachusetts. C. C.

The expression "carbonizing wool" is a misnomer, for it is the vegetable matter mixed with wool that is carbonized. The wool is not supposed to be affected, whatever the facts may be. Sulphuric acid is the chemical generally used for this purpose, but there are other chemicals employed that are found to be quite satisfactory, receiving the endorsement of some of the largest scouring establishments. All of the methods employed, however, depend upon the action of some acid upon the vegetable matter, which is disintegrated. Care has to be exercised in the use of acid, so that it shall have no injurious effect upon wool. Animal fibres, like wool and hair, are much more easily affected by chemicals than vegetable products. We speak generally. Temperature, also, has an effect upon animal matter. This should be remembered and caution practiced, for water, at a temperautre of 400° F., dissolves wool, and any lengthy boiling of the fibre affects its lustre. It is stated on good authority that "by steaming thoroughly cleansed woolen cloth at a temperature of 210° F., the material is weakened to an extent of 18 per cent. in three hours."

Though sulphuric acid is used, as noted, it is capable of dissolving wool, if used in a concentrated form, i. e., at a specific gravity of 45° Tw.; but the strength usually used in the carbonizing process does not affect wool to any appreciable extent. The acid, however, has a direct effect upon cotton or other vegetable matter, and if the latter is heated

with an acid solution on it of 2° to 3° Tw., at a temperature of 200°, the cotton is destroyed by disintegration, rather than by decomposition. The wet carbonizing process is the one mostly in use, though there is a dry, or gas, carbonizing process, which consists in exposing the wool or rags to hydrochloric acid gas in a heated chamber. The action is similar to that effected by sulphuric acid. Hydrochloric acid and sulphuric acid act almost identically alike.

The use of aluminium chlorides is sometimes resorted to, but this is something comparatively of recent date, and we do not think it is much employed. A very recent work, from an excellent authority, refers to the process in which this material is used, as being not in practical use, though satisfactory on an experimental scale. We were recently at one of the largest scouring establishments in this country, where we saw wool that had been passed through a carbonizing process, in which this material was used as the chief ingredient, and the result was excellent. This process of carbonizing vegetable matter is based upon the property which aluminium chloride has of decomposing when its aqueous solution is evaporated to dryness. Woolen rags, for instance, are simply saturated with a solution of normal aluminium chloride and dried after the excess of liquor has been removed by mechanical means. The hydrochloric acid which is liberated destroys the vegetable matter. We will say that at the scouring establishment referred to, a temperature of 220° to 230° F. was used, after an exposure at a lower temperature.

New Publications.

Cassier's Magazine, for February, New York: The Cassier Magazine Co. Price 25 cents per number. This number is a credit to the magazine, in the character of its articles and the manner in which they are presented with illustrations. The articles which attract our attention are the following: The Japanese Battle Ship "Yashima," the fastest armour clad in the world; Mechanical Stokers, their history and development; Floating Docks, their status in modern dockyard engineering.

Theory and Practice of Rational Spinning. Vol. I. and Vol. II., by Heinrich Bruggemann, professor of spinning and weaving at Muhlhausen. Stuttgart: Arnold Bergstrasser. This work is in the German language. There is no English translation. Volume one treats of the necessary properties of cotton yarn, with special reference to cotton spinning. Accompanying this volume is an atlas of tables with a large number of technical illustrations of the working parts of machinery. The subject is treated with a vast amount of detail, characteristic of German thoroughness. A large portion of this volume is devoted to the numbering and testing of yarn for strength, moisture and condition. Volume two is devoted to the manufacture of hemp, flax, etc., and to the detailed study of spinning. This volume is accompanied by an atlas of twenty-four tables, and a multitude of illustrations explaining the text. The price of Volume I. and atlas is $3, and that of Volume II., with atlas, $6. These are master works of their kind.

Wm. J. Matheson & Co., Ltd., 178 Front St., New York. We are in receipt of sample cards of specimen yarns, showing the effect of the following dyes, sold by this house: Oxy-Diamine Black B, topped with one-dip Aniline Black, and Diamine colors on cotton yarn printed with soda-lye before the dye is applied.

United States Geological Survey. Published by the United States government. A continuation of part five of the annual report of the U. S. Geological Survey, to the secretary of the interior, for 1896-97, by Charles D. Walcott, Director, is just at hand. This part is devoted to the mineral resources of the United States, the 1896 non-metallic products, except coal. This is a large volume of 700 pages, on heavy paper, and takes up such subjects as coke, petroleum, natural gas, stone, soap stone, the clay working industry, cement, precious stones, phosphate rock, gypsum, salt, fullers earth, and mineral waters.

Yale Review, for February, 1898. New Haven, Ct.; Tuttle, Morehouse & Taylor. This is the fourth number of volume six of this quarterly journal for the scientific discussion of economic, political and social questions. The February number contains a variety of timely articles, as will be noted by the following: The Incindence of Taxation in the United Kingdom: Prevailing Theories in Europe as to the Influence of Money on International Trade; The Franchises of Greater New York; Agricultural Depression in England; Modern Social Reform and Old Christian Ideas.

Appleton's Popular Science Monthly, for February, 1898. New York: D. Appleton & Co. $5.00 a year. President David Starr Jordan opens the number with a paper on The Evolution of the Mind, in which he traces, from the laws which govern the growth of a single cell, those determining national and individual greatness and ethical morality. The Scientific Progress of the Closing Century, by Prof. Ludwig Buchner, the eminent German scientist, gives a brief general account of one of the most fertile periods of human history. What is Property? is the title of an article from David A. Wells. The loose notions which prevail regarding property, and the large share which this has had in bringing about unjust and ineffective taxation, are pointed out. Other articles appear on Education in the Animal Kingdom; The Primary Social Settlement; The United States Forest Reserves; Modern Social Problems; Evolutionary Ethics, and Feet and Hands.

Industrial News.

—Sykes & Street, 85 Water St., New York. We have received a color card from this well known house, showing the results of recipes in which are used some of their direct dyes for yellow, orange browns, blues, greens, etc.

—R. S. Hale has been appointed consulting engineer of the Mutual Boiler Insurance Company, 31 Milk St., Boston,

and his services are at the call of the members of the company, for advice on the general condition of steam plants, not including the inspection of boilers, which will be conducted in regular course by the inspectors of the company. It is the intention of the company to develop the work of investigation, which has been conducted by Mr. Hale, under the title of "Steam Users' Association," so far as it can be done without adding to the necessary expense of boiler insurance, taking cognizance of the matters pertaining to the manufacture of steam, steam appliances, the relative value of steam coals, and other matters of like kind.

—The Dudley Mills, of Newton Lower Falls, Mass., who have had trial sets of Musgrove's Automatic Brushers in use for the past three months, have recently placed an order for the equipment of all their machines with this attachment. Charles M. Musgrove, Plainville, Conn., is the manufacturer of this device, as well as of the Musgrove Quarter-Saver for spring needle knitting machines.

—Albert Bohm, New York, has, in consequence of a fire that destroyed his office at 114 Nassau St., moved to the Wool Exchange Building, West Broadway & Beach St., Room 1,001.

—The contract for furnishing and erecting the new steel building about to be put up by the Benjamin Atha & Illingworth Co., Harrison, N. J., has been given to the Berlin Iron Bridge Co., East Berlin, Ct. The framework of the building is to be steel throughout, and the siding and roofing of corrugated iron. This company has also received the contract for furnishing and erecting the steel framework of the new power house of the American Coffee Company, Brooklyn, N. Y. The building is to be 70 feet wide and 120 feet long, the supports and roofing to be of steel. This company have also the contract for furnishing and erecting the steel roof work of the new gas plant, to be put up by the Boston Gas Light Co., at Commercial Point, in the vicinity of Boston. This new plant will consist of a building 52 feet by 185 feet. The roof will be covered with slate, supported on steel trusses and frame. The Berlin Iron Bridge Co. is also furnishing the steel framework and covering of the roof and sides, and the metal run-way for a traveling crane, for the enlarged plant of M. C. Henry & Company, New York City.

—The general offices of the National Association of Manufacturers, including the office of the president, Theodore C. Search, have been removed from No. 1743 North Fourth Street, to the Bourse, Fourth Street below Market, Philadelphia.

—One of the very best things for cleaning a bicycle is a raw silk wiper. The American Silk Company, of 311 Walnut St., Philadelphia, make an exceptionally good line of raw silk wipers, and nothing better can be had for easily and effectually cleaning a bicycle. Quite a trade is being done in these wipers, and they give universal satisfaction. All kinds of fine machinery should be cleaned with the silk wipers instead of the usual unclean waste.

—The Alabama Cordage Co., Montgomery, Ala., manufacture a high grade of cotton rope, twine, sashcords and yarns. The mill is now in a more flourishing condition than it has ever before been. J. B. Harkey is superintendent; G. W. Crouder, overseer of carding; G. W. Cushman, overseer of spinning.

—Innis & Co., dyewoods, dyestuffs, etc., have removed their office and warehouse from 120 Williams St. to 3 Cedar St., New York, where they will have more commodious quarters, and greater facilities for transacting business.

—The 64th meeting of the New England Cotton Manufacturers' Association will be held in Boston on the 27th and 28th of April.

—There has been a concerted action on the part of the cordage manufacturers of this country, for an advance in the price of their commodity. This was consummated at the meeting and banquet of cordage manufacturers, in New York, last month, at which there was a full attendance of representatives of the industry. It was then agreed to advance the price of twine and cordage 1-4 cent a pound, or about $5 a ton. It is stated that most of the manufacturers have been losing money at the prices hitherto prevailing, where under the new price they will be able to make a profit.

—The new spinning frame built by the Howard & Bullough American Machine Co., Pawtucket, R. I., and recently described in our columns, is meeting with great success. The firm have a large number of orders in hand, and have already received repeat orders for this machine. This company has received a repeat order from the Sycamore Mills, Sycamore, Ala., for revolving flat cards, and orders have been received from the Putnam Mfg. Co., Putnam, Ct., for one of their improved bale breakers, and from the Manchester Manufacturing Co., Macon, Ga., for 12 spinning frames and for revolving flat cards.

Magnolia Webbing Company.

In the list of new mills published in our January issue, the Magnolia Webbing Works appeared with the comment:—"moved from Cincinnati, Ohio." Mr. Summerville, the proprietor, informs us that he has never done business in Cincinnati, and that his plant is an entirely new one. They manufacture back bands, webbing and so forth.

Incandescent Lamps.

The Lynn Incandescent Lamp Co., Lynn, Mass., whose advertisement appears on page 176, make a specialty of renewing burned out lamps, and in the prosecution of their work have noted the defects of incandescent lamps that became necessary in order to make proper repairs. In repairing some 700,000 lamps, they claim to have examined and tested the lamps of every manufacturer, and assume to be able to tell which are the best lamps and their ability to strengthen their weak points. Their experience has led them to believe that they can make a lamp of superior capacity, by avoiding the defects often found in lamps, and utilizing the features that have made their renewed lamps so popular, and at the same time meet the demand for a new lamp, with the life and sustained candle power of their renewed lamps. Their lamps are noted for their high vacuum and their power of radiating light and not heat. They have a "flashed"

surface on the filament that wears, and a vacuum that prevents the escape of heat, making the lamps efficient and long lived. The "flashed" surface and the vacuum being equal, one lamp is as good as another, providing it has no mechanical defect, such as a poor collar or an unsightly shaped bulb. Those in want of incandescent lamps would do well to inquire into the merits of those advertised by this company.

Significant Action.

The annual meeting of the Massachusetts Cotton Mills, of Lowell, was held February 14, at the office of the treasurer, in Boston. On the same day was held the annual meeting of the Massachusetts Mills in Georgia, under the same control.

Reports on the year's business of the two mills were presented to the stockholders. These showed that the mills in Lowell, in common with other Northern manufacturers of cotton goods, had suffered from the depressed condition of the cotton goods trade and low prices, which were below what many classes of goods could be produced for under the rates of wages obtaining in Massachusetts. On the other hand, the plant in Georgia, making goods precisely similar to those made in Lowell, and obtaining the same prices, owing to the lower cost of manufacture, due to cheaper wages, longer hours, lower taxation and lower cost of power, had been able to return a fair profit. Influenced by these results, the following vote was passed unanimously by the stockholders:

"In view of the fact that certain products of the Massachusetts Cotton Mills at Lowell can be produced at the mill in Lindale, Ga., for a lower cost than they can be produced at Lowell, it is therefore

"Voted, That the Directors be instructed to consider the possibility of an extension of the business in Georgia, and report thereon at some future meeting of the corporation."

Knit Goods Manufacturers.

At the annual meeting of the National Association of Knit Goods Manufacturers, held in New York, Feb. 25, the following officers were elected:

President, A. B. Valentine, New York; vice president, Theodore Frelinghuysen, Phoenix Mills, N. Y.; J. F. Hanson, Macon, Ga.; A. W. Sulloway, Franklin, N. H.; J. B. Colvin, Ypsilanti, Mich.; G. C. Boyden, Providence, R. I.; Swits Conde, Oswego, N. Y.; J. S. Carr, Durham, N. C.; James Talcott, New York; J. S. Rand, Morristown, Pa., and Charles Cooper, Bennington, Vt.; treasurer, A. S. Haight; secretary, Howard W. Bible; executive committee, Charles Chipman, Germantown, Pa.; J. H. Parson, Cohoes, N. Y.; W. S. Wiley, Catskill, N. Y.; W. S. Lloyd, Philadelphia.

The report of the president reviewed the work of the association during the past year, particularly with reference to the tariff. It recommended the appointment of a legislative, a foreign trade and a labor committee, which recommendation was adopted.

The Mechanics Fair.

The twentieth triennial exhibition of the Massachusetts Charitable Association, popularly known as "The Mechanics Fair" will be held this year in the Mechanics Building, in Boston, from October 10th to December 3rd. From the advance information given out, we predict that the coming exhibition will excel all its predecessors in point of interest. The management has been placed in the hands of an executive committee; all well-known business men. The secretary of the committee is Henry D. Dupee, who is widely known by textile manufacturers.

No charge will be made this year for space occupied by mechanical exhibitors, and exhibits will be returned free of charge after the exhibition; in other words, freight will have to be paid only one way.

Entirely new and novel features have been devised for the entertainment of visitors, not only in the way of music, but by methods never before conceived by any exposition management, not excepting the World's Fair at Chicago.

This insures a large attendance, and affords an opportunity for publicity which is sure to be availed of by the best class of exhibitors.

New Postals for Old.

Our attention was called some time ago to an advertisement offering cash for uncancelled printed postal cards. Having a large amount of out of date printed postals on hand, which were simply so much waste paper, their day of usefulness having passed; the matter was investigated.

The advertiser has discovered a process by means of which he is enabled to cover the printed matter on either side of a postal card with an opaque substance, which gives it the appearance of a new card, and upon which there is no difficulty in writing, or printing.

The solution is compounded by the inventor, at night, and is given to his girls to use next morning. It is a good idea, and if only the inventor can retain the secret of his composition, there is undoubtedly a large amount of business ahead for him, for almost every business house has a lot of uncancelled printed cards which can thus be utilized.

As stated the process has been tried by the Textile World, and found perfectly satisfactory and most assuredly it carries out all that the inventor claims for it. The Swain Mfg. Co., is the concern which does this work and their advertisement appears elsewhere in this issue.

—We have just received a unique calendar for the desk, from the Excelsior Knitting Machine Mfg. Co., Allentown, Pa., manufacturers of the Excelsior three-quarter automatic knitting machine.

—John S. Adriance, 105 East 39th St., New York, is making a fine record for himself as analytical and consulting chemist for manufacturers. His examinations of mill supplies have given much satisfaction. Mr. Adriance makes a specialty of this.

Recent Sales of Mill Stocks.

	Lowest.	Highest.
Cornell,	102½	102½
Stafford,	100	101
Union,	141¾	145
Wampanoag,	96	96
Amoskeag,	1300	1320
Appleton,	275	275
Cocheco,	173¾	175
Dwight,	775	790
Edwards,	140	144¾
Everett,	55	60⅜
Great Falls	130	130⅛
Hamilton	652½	680
Hamilton (woolen),	40	40½
Laconia,	560	565
Lawrence,	107¼	107¼
Lowell Mfg. Co.,	525	537½
Lyman,	51½	56½
Manchester	100	101⅛
Merrimack,	925	935
Pacific,	1870	1950
Pepperell,	1247½	1247½
York,	597½	602½
Amory,	121	125
Stark,	850	850
Naumkeag,	50	51
Arlington,	106	106¼
Lancaster,	301¼	305
Hargreaves	100	100
Sagamore,	95	97
Slade,	10	10
Chicopee,	50	50
Massachusetts,	80	80
Middlesex,	119	119¼
Barnaby,	50	50
Flint	100	100
Atlantic,	50¼	50¾

MILL NEWS.

Cotton.

New Mills.

—Alabama, Tuscaloosa. It is reported that D. J. Griffin desires to locate a cotton wading factory here, and that the town has offered inducements. Mr. Griffin's cotton wading factory at Memphis, Tenn., was destroyed by fire in September, 1896.

—*Arkansas, Little Rock. Maxwell Coffin informs us that he with others is endeavoring to arrange a plan for a large cotton mill there, but has nothing definite to report as yet.

—*Georgia, Harmony Grove. We understand that G. W. D. Harber is now in New England arranging for cotton machinery for a new mill in which he and his brother are interested. Their capital is $100,000. They recently withdrew from the Harmony Grove Mills, as mentioned last month. Their new mill will have 5,000 spindles and 200 looms.

—*North Carolina, Albermarle. The new cotton mill, which we reported in our issue of February 4, to be located here, has been incorporated under the name of the Wiscossett Mills Company; capital stock, $175,000, with a privilege of increasing it to half a million; shares, $100 each. The incorporators are J. W. Cannon, J. S. Elfird and K. J. Davis.

—*North Carolina, Cherryville. Regarding the proposed new cotton mill at this place, Rudisill and Adelholdt inform us that the new building may possibly be completed by October, 1898. They will use steam power, and make either coarse yarns for carpets or rope and twine. The company has not yet been organized, and we should judge that the project was not fully assured.

—*North Carolina, Elizabeth City. The plant of the North Carolina Net & Twine Co., which was recently burned, will be rebuilt.

—*North Carolina, Kinston. Regarding the new cotton mills here, J. F. Taylor informs us that the company was incorporated February 3, 1898, under the name of the Kinston Cotton Mills. Capital $55,000, with a privilege of increasing to $300,000. President, N. C. Fields; vice president, N. J. Rouse; secretary, J. F. Dunn; treasurer, A. F. Taylor. The purpose is to build at once a mill to make hosiery yarn. Mr. Taylor is also treasurer of the Orion Knitting Mills, at Kinston, manufacturers of hose and half-hose.

—Pennsylvania, Easton. Charles Chipman's Sons will probably be able to start operations in their new mill at this place, sometime this month. The architect is William Nichols; builders, F. J. Lerch & Bro. It will be remembered that they bought the building of the Matteawan Valley Co., and are adding to it. This mill will produce cotton hosiery yarn, to be used by them in their knitting mill here.

—Tennessee, Memphis. A charter has been granted to the Memphis Cotton Mill Co. Capital stock, $120,000. The incorporators are Austin Miller, Noland Fontaine, J. E. Beasley, Louis Erb, S. H. Brooks, J. F. Graham, John Johnson and John B. Clouge.

—*Pennsylvania, Wilkesbarre. Wyoming Valley Lace Mills inform us regarding their new mill, that work of building same was started March 1st and the mill put in operation Aug. 1st, 1898. The product will be lace curtains, employing 125 to 150 hands. This will be known as Mill No. 2 of the Wyoming Valley Lace Mills, and will contain 10 looms. Contracts are not let for automatic sprinklers, elevators, fire doors, steam engine, boiler and pipe covering, shafting and hangers, skylights, watchman's clocks, measuring and folding machinery.

Enlargements and Improvements.

—*Georgia, Augusta. Clark & Co., proprietors of the Globe Cotton Mills, confirm the statement that they are to add one thousand new spindles.

—*Georgia, Augusta. The changes at the Augusta Factory are nearly completed. Two thousand new spindles have been put in, and 200 looms.

—Georgia, Griffin. The Kincaid Mfg. Co. will build a new mill or put an addition on to its present plant, which will

double its capacity. It is thought that $125,000 to $150,000 will be expended. The new equipment will include 64,110 spindles, and 228 looms. Their output is crash towelling. W. J. Kincaid is president, and James M. Brawner treasurer.

—North Carolina, Huntersville. The Anchor Cotton Mills will put in 2500 spindles and 100 looms, which will double their capacity. A new building, two stories, of brick, will be erected. H. Robins is secretary of this company. Last December this company obtained control of the Virgin Cotton Mill, and made some improvements in the plant, at that time.

—Pennsylvania, Chester. The Byram Mfg. Co., maufacturers of jeans, are building an annex to their plant, at Third and Booth Streets.

—*South Carolina, Union. The Union Cotton Manufacturing Co. have recently increased their capital stock from $600,000 to $1,200,000, and will build a new mill, giving employment to about 500 more hands.

—Arkansas, Mammoth Springs. The Mammoth Springs Cotton Mill has recently added 5000 spindles and 125 looms.

—*North Carolina, Franklintown. The Sterling Cotton Mills confirm the report that they are to enlarge. Work was started March 1st on the addition, and the new machinery will be ready to start about July 15, 1898. 4160 new spindles will be put in, employing 100 more hands, and making a total of 6240 spindles. Product is single and ply warps and ply yarns in skein. This company was organized 2 years ago and has a paid-up capital of $62,000. President, Geo. Winslow; treasurer and agent, Geo. Vance; superintendent, D. M. Cook; sells direct. Contracts are not let for automatic sprinklers, belting, spools, bobbins, cotton openers and lappers, elevator, shafting and hangers, skylights, watchman's clock.

Mills Starting Up.

—Rhode Island, Providence. It is reported that Harold Lawton, of the Warwick Mills, Centreville, R. I., Stephen A. Jenckes, and others have purchased the mill in Olneyville known as the J. L. Ross mill, which has been in the hands of J. Lewis Pearce, trustee, to be sold for the creditors. Some of the present machinery will be taken out and new equipment put in, for making hosiery yarns.

—Utah, Washington. The Rio Virgin Cotton Mills at this place, which have been shut down for six weeks, have now been started up by lessee Thomas Judd, who will operate the mills until next June.

Mills Shutting Down.

—New Hampshire, Nashua. The Vale Mills have been shut down, and it is understood that the company will go out of business. The property has been managed by Parkman Dexter, for the heirs of S. P. Dexter.

Woolen.

New Mills.

—*Kentucky, Uniontown. The woolen mill, which we previously reported would be built by Owensboro capitalists, will be erected in the spring.

—Maryland, Lewiston. John H. Hill and Ersom L. Bortner, who have been doing business under the name of the Shady Elm Woolen Co., at Kernstown, Va., have dissolved partnership, and it is now announced that busines will be carried on by E. L. Bortner and Allen B. Bortner, under the firm name of E. L. Bortner & Son, located at Lewiston, Md. They will manufacture woolen goods, blankets and yarns. George W. Spahr will be their travelling salesman.

—New Jersey, Camden. Benjamin F. Boyer & Sons (worsted yarn manufacturers), have had plans prepared for a $15,000 mill, 65x100 feet, located at Delaware Ave. and Cooper St. The building is to be put up by John F. Starr, Jr. B. F. Boyer & Co. are at present located at Point and Pearl Sts.

—*Ohio, Lisbon. Nicholas Way, secretary of the new Lisbon Woolen Manufacturing Co., whose plant was destroyed by fire January 10, 1898, informs us that it will be some months before they can rebuild, and that the company will be reorganized.

—*Pennsylvania, Hulmeville. It is now reported that bids have been received for the mill to be built here by J. Frederick Rumpf & Sons, from plans of architects J. C. Stuckert & Son, Philadelphia. The building will be 50x300 feet, brick and iron. This project was mentioned last autumn, but was then postponed.

—Pennsylvania, Wilkesbarre. Samuel Feather has resigned as superintendent of the Magee Carpet Works, Bloomsburg, Pa., and will operate the mill at this place, under the name of Samuel Feather & Co. Equipment will be put in for drawing, spinning and twisting yarn.

—Rhode Island, Woonsocket. James F. Gilleran, formerly superintendent for W. H. Pendergast, Pascoag, R. I., and S. W. Harding, of same company, will manufacture cotton worsteds, on the two upper floors of the American Worsted Company's Mill. About 20 looms will be operated, and finishing machinery put in, employing nearly 75 hands. It is expected that operations will be begun by the last of March. The name of the company will be Harding & Gilleran.

—*South Carolina, Gaffney. Regarding the carpet mill to be built here, the company has obtained a charter. Capital stock is $60,000, with a privilege of increasing to $500,000. It is understood that the building will be started soon, and, as mentioned, the interested parties are J. A. Carroll, H. D. Wheat, F. D. Stacey, and others.

—*Tennessee, Jackson. It is now definitely decided that the Jackson Woolen Mills, destroyed by fire last August, will be rebuilt here. Subscriptions have been received, and plans have been prepared by P. E. Vanderbrooke. F. P. Cantrell is manager of the company.

—*Virginia, Jack's Mill. John T. Price, of this place, informs us that he expects to start a plant in July making woolen yarn, jeans, linseys and blankets. This will be a one-set mill, employing six people, with two or three looms. He has a water power of about 250 H. P. developed, part of which will be used in a planing and flouring mill. He is in the market for an entire equipment.

—*Virginia, Winchester. Kern, Bar &

Walter will rebuild their woolen mill, recently burned.

Enlargements and Improvements.

—New York, Albany. F. C. Huyck & Sons will probably enlarge their felt mill.

—Ohio, Hamilton. Shuler & Benninghofen, proprietors of the Miami Woolen Mills, at present equipped with 23 looms, making paper makers' feltings, yarns, flannels, blankets, etc., inform us that they will very likely increase their number of looms during this year.

—Pennsylvania, Philadelphia. The George Campbell Co., proprietors of the Continental Worsted Mills, 21st St. and Washington Ave., are adding more French drawing and spinning machinery. They recently put in a 250 H. P. boiler, and we understand that they are in the market for a large engine. The present capacity of the plant is 5,000 pounds daily, and when the enlargements are completed, this will be increased to 10,000 pounds daily.

—Rhode Island, Harrisville. William Tinkham & Co. will probably build a large addition early in the spring. They have recently put in two new Crompton & Knowles looms.

—Utah, Hyrum City. The Hyrum Woolen Mills Co., of which Barron & Housley are proprietors, are building an addition. They have put in one new loom, two sets of cards, and two knitting machines. They do largely custom work, making blankets, lindseys, flannels and yarns.

—*Wisconsin, Janesville. Regarding the addition recently mentioned, to be built by the Rock River Woolen Mills, of which Jonathan Ellis is proprietor, he informs us that this work will probably be completed by April 10, to give employment to ten more hands. They will put in five new Knowles broad looms, giving their total number of broad looms 29, and four sets of 48-inch cards. They will add one Furbush spooler, and the product will be line Meltons exclusively, all weights and colors.

—Oregon, Union. The Union Woolen Mill Co. will build a dye house 44x46, into which some of the machinery now in the main building will be transferred.

—*Pennsylvania, Mifflintown. The carpet mill of Kauffman & Harley is being rapidly rebuilt, and will probably be ready to start within a week. The building was damaged by fire on Feb. 3rd.

Mills Starting Up.

—*Connecticut, Mechanicsville. The French River Textile Co. is gradually getting its plant into operation. Looms are being started every day. The weaving department will be in charge of Thomas Sheriff.

—*Indiana, New Albany. The officers of the New Albany Woolen Mill Company recently organized have been elected as follows: President, William T. Grant; secretary and treasurer, Joseph Sabel; general manager, John F. Gebhart. The plant will be put in operation as soon as the necessary repairs to the machinery have been completed.

—*Iowa, West Point. The West Point Woolen Manufacturing Company, recently mentioned, will be started up March 1, 1898, employing 20 hands, making skirts, flannels and blankets. This is a one-set mill, with ten looms. They have a dye house and will also put in two new knitting machines. F. Kreikenbaum is president; J. K. Kreikenbaum, treasurer, and L. C. Wanamaker, selling agent.

—*Massachusetts, Blackstone. The transfer of the Waterford Woolen Mills, at Blackstone, to Charles Fletcher, of Providence, from the Earl T. Mason Land Co., the heirs of Bailey W. Evans, and the heirs of Coley Seagraves, has been made, and it is expected that the two large mills which comprise this property will soon be started up by Mr. Fletcher. It is understood that the machinery has been kept in excellent condition during the long idleness of the mills.

—Massachusetts, Palmer. The mill of the Palmer Carpet Company has resumed operations, with good prospects of steady work in the future.

—*Vermont, Saxton's River. The woolen mill here is now started up, under the management of the Saxton's River Worsted Co., made up of New York commission merchants. Alexander Smith & Co., who recently operated the plant were petitioned into insolvency recently. We understand that they are buying yarns for the present.

Mills Shutting Down.

—Connecticut, Thompsonville. The Hartford Carpet Company have posted a notice that their two worsted departments, known as the "Lower Mills," will be shut down until further notice. This throws about 250 hands out of employment.

—Massachusetts, Palmer. Holden & Fuller's Woolen Mill has shut down. No statement has been given out when the plant will be started again.

—Pennsylvania, Lenni Mills. The plant of the Parkmount Mills Company was closed by a sheriff, February 8, on executions for $17,000. Attachments were entered by J. H. Lane & Co., of New York, and others.

—Rhode Island, East Greenwich. The Phoenix Woolen Mills have shut down for repairs.

Knit.

New Mills.

—Georgia, Barnesville. It is reported that the J. C. Collier Co. propose to establish an underwear mill at this place, and are now investigating the cost of equipment.

—Georgia, Meansville. A charter has been granted to W. A. Bates, J. M. Means, J. L. Tavis, and others, to build and operate a knitting mill here. The capital is $50,000. They are to manufacture knit goods, hosiery, etc. The name of the corporation is not stated. The mill will probably be built during this spring.

—Michigan, Coldwater. A knitting mill is talked of for this place, and a committee has been appointed to investigate, consisting of E. R. Clarke, Alfred Milnes and H. C. Loveridge.

—*New Hampshire, Hookset. W. C. Mudgett informs us that he has moved his business, as recently mentioned, from Concord, N. H., to Hookset, on account of cheaper facilities. He expects to start work March 1, 1898, employing 15 hands, with 25 knitting machines, 5 of which will be new, using electric power. He will make ladies' and men's cotton and woolen hosiery.

—*New York, Fort Plain. The Diana Knitting Mills is the name taken by George A. Vosburgh for his new mill here, which he expects will start about February 20, 1898, employing 75 to 100 hands, making ladies' ribbed underwear in lisle, silk, worsted and Egyptian. Sixteen new knitting machines will be put in, and steam power will be used. Horace D. Buck will be superintendent, and Potter & Levy, New York, selling agents. We recently reported that Mr. Vosburgh had bought the machinery of the Saucana Knitting Mill at Hellertown, Pa. We now understand that he is moving this to Fort Plain.

—*Pennsylvania, Harrisburg. The new hosiery mill for this place, in which we reported P. H. Lamey was interested, is to be known as the West End Knitting Mill, located on Pennsylvania Avenue, above Maclay St. It is expected that this mill will give employment to about 200 hands, and begin operation in the early spring.

—*Pennsylvania, Hawley. H. Nollan, proprietor of the United States Knitting Mills, which were destroyed by fire December 19, informs us that it will probably be May or June before his new mill is ready to start work. He has bought land adjoining the lot on which the old mill stood, which gives him a lot 200x200. Foundations for the new plant have been started, and the prospects are that the new plant will be much larger than the old one. He makes sweaters, caps, golf leggings, cardigan jackets, etc.

—*Pennsylvania, Mahanoy City. Jones & Johnson, proprietors of the Eagle Hosiery Mill, which was destroyed by fire January 23, inform us that they will rebuild at once, and expect to have the plant in operation by March 1, 1898. They will produce ladies' and men's full, seamless hose and misses' hose, employing about 150 people, with a dye house. They are in the market for hosiery knitting machinery, presses, shafting, hangers, pulleys, bobbins and dye tubs.

—*Pennsylvania, Norristown. Rambo & Regar, hosiery manufacturers, have just completed their new mill here, into which they will move very soon. The building is 46x195, three stories, which gives them very much larger quarters.

—*Pennsylvania, Perkasie. The Perkasie Knitting Co. is the name adopted for the new knitting mill here. The president of the company is Henry O. Moyer; secretary, Greer Scheetz; treasurer, D. H. Myers. The building is 34x60 feet. Power will be had from a gasolene engine. The company will produce knitted underwear. Chas. J. McOsker will be manager. Capital stock of the company is $10,000. Work has just been started.

—South Carolina, Scotland Neck. M. A. Smith, who has been foreman at the Scotland Neck Cotton Mills, manufacturers of hosiery and underwear, is reported as contemplating starting a new knitting mill, which will employ about 60 operatives.

—*Texas, Cuero. Burgoyne Fish informs us regarding the new hosiery plant, which he and others are starting here, that their capital will be about $1500. They will lease a building and expect to start work April 1, 1898, employing about eight people, making gentlemen's half-hose, ladies' hose, and possibly boys' and girls' hose, with three to five machines, and a dye house. They will put in 3-4 automatic Branson machines. Mr. Fish was formerly employed in New England mills.

—*Wisconsin, Steven's Point. The branch factory of H. S. Blake & Co., proprietors of the Racine Knitting Mills, Racine, Wis., were recently started, giving employment to 150 operatives. This is a new plant and has been previously mentioned.

—*North Carolina, Scotland Neck. Work on the building to be erected for M. A. Smith, who will operate a knitting mill here, as recently mentioned, has been started. The product will be ladies', misses' and boys' ribbed hosiery. Daily capacity, 250 dozen pairs. It is expected that the plant will cost about $6,000, and that same will be started by April 1st.

—*Pennsylvania, Middletown. H. A. Romberger, 2220 N. 13th St., Philadelphia, confirms the report that he has sold his knitting mill at Lykens, Pa., and states that he will start a mill at Middletown about June 1, 1898. Work on the building will be started March 14. He will operate 50 knitting machines (all new), and employ 100 hands at the start. Product will be fine gauge seamless half-hose and ladies' hose. Building will be of brick, 40x115, 3 floors, and contracts are not let for automatic sprinklers, belting, power elevator, knitting machinery, iron smoke stack, finishing machinery, transmission equipment, scales, sewing machines, steam boiler and engine.

—Pennsylvania, Pottstown. A building has been leased here by J. D. Clemons, Jonas S. Wagner and H. M. Boone, to be used as a hosiery factory. About 25 machines will be put in, employing 30 hands at the start. Building is located corner of York and Walnut Sts.

—Pennsylvania, Reading. The S. & S. Hosiery Mills, formerly on the fourth floor of the Review Bldg., have moved to the new building corner of Reed and Elm Sts., where they will occupy the entire first floor. 40 new machines will be put in, employing 60 hands.

—Wisconsin, Appleton. The Appleton Knitting Co. is having built for them an addition 24x100, two stories. The contractors are the Green Bay & Mississippi Canal Co. It is expected that the building will be completed within three weeks, and as the machinery has already arrived, the plant can be soon started. 30 more hands will be employed and the capacity doubled. At present, they operate 16 knitting machines.

Enlargements and Improvements.

—Pennsylvania, Mohn's Store. The Wyomissing Hosiery Co. will build an addition. A. S. Honberger is business manager and superintendent. Their present equipment is 75 knitting machines.

—Rhode Island, Pawtucket. Preparations are being made by the Lebanon Mills Co., to build a new three story building, on the east side of the Blackstone River. The stucture will be 155x75

feet. This is expected to double the present capacity of the plant.

—South Carolina, Union. The Excelsior Knitting Mills, at this place, have increased their capital stock from $10,000 to $20,000.

Mills Starting Up.

—*New York, Athens. The new mill of the Athens Knitting Co. is equipped with three sets of woolen cards, 30 knitting machines, steam power. They employ 80 to 90 people, making fine grade cotton and wool fleece lined underwear for men and boys. Capital stock, $40,000. President, Frederick Jessup; secretary, F. J. Sagendorph; agent, Charles Whitbeck; superintendent, John McGinnis.

—New York, Hudson. The Harder Knitting Co.'s mill, which has been shut down for over a month, has resumed operations. The machinery has been overhauled, cleaned and renewed.

—Pennsylvania, Clifton. The two-story brick mill, known as the Modoc Mill, which has been idle for the past three years, has been leased to Sylvester Taylor, a Canadian, who will fit up the building for manufacturing hosiery.

—Pennsylvania, Myerstown. I. W. Forry & Son, hosiery manufacturers, of Shamokin, are making plans to start work again in the building occupied by them before removing to Shamokin. They are obliged to work overtime and then are not able to fill the numerous orders. Geo. A. Martin will be placed in charge of the factory at his place. Employment will be given to about 50 boys and girls, the number to be gradually increased.

Silk.

New Mills.

—*Connecticut, Mystic. The new mill for the Rossie Velvet Co., 42 Greene St., New York, will probably be ready to start soon after March 1. R. B. Kohn, 96 Fifth Ave., New York, is the architect.

—*New Jersey, Paterson. In connection with the new plant of the Audiger & Meyer Silk Co., which was mentioned recently, will be operated a silk ribbon mill, by Julius Brandes, recently of the Wm. Wicke Co., of New York. A new building will be built to accommodate both plants, in So. Paterson, near the home of Mr. Brandes. He will probably operate about 200 ribbon looms, and the other company about 200 broad looms.

—Pennsylvania, Newhope. A silk mill will probably be located here by Paterson, N. J., manufacturers. Chester Ely, a promoter from Paterson, is interested. The people are asked to subscribe $15,000, and the manufacturers will put in $20,000 worth of machinery. A committee was appointed to investigate, consisting of Charles Roberts, Joseph B. Schermerhorn, and others.

—*Pennsylvania, Phoenixville. The Phoenixville Industrial Association, composed of subscribers to the new silk mill industry here, have elected the following directors: Paul S. Reeves, Amos G. Gotwals, C. H. Howell, T. L. Snyder, J. F. Starkey, Jr., J. Salismant, V. N. Shaffer, J. B. Eldridge, and T. D. Grover. The directors have organized by chosing P. S. Reeves, president; A. G. Gotwals, treasurer; C. H. Howell, secretary. Capital stock is $66,200 par value per share, $50.

—*Pennsylvania, Reynoldsville. J. W. Place, of New York, representing the American Silk Company, is here arranging for the putting in of the new silk plant. Contracts will be let in a day or two, and the work is to be rapidly pushed forward. The mill, which will be put in operation about July 1st, will be used for the manufacture of broad silks.

—*Pennsylvania, So. Bethlehem. The Duplan Silk Co. has been incorporated with capital stock of $100,000, at Albany, N. Y., with the following directors: Emory J. Lipps, John B. Cozzens, Fritz Eibers. It will be remembered that there has been a report current that the firm of Duplan & Co., of Lyons, France, were to locate a branch at this place.

Enlargements and Improvements.

—Connecticut, Bridgeport. The Bridgeport Silk Co., which is now located in its new factory on Howard Ave., will probably enlarge their equipment and employ 50 more hands. Their present force is 250.

—New Jersey, Paterson. Frank & Dugan will soon have 35 new Schaum & Uhlinger ribbon looms in operation in the Dale Mill.

—*New Jersey, Paterson. We wish to correct our recent statement regarding the Ashley & Bailey Company's enlargement of their dye house. This will increase the capacity from 1400 to 1600 pounds daily.

—*North Carolina, Wadesboro. The Wadesboro Silk Mill has announced that they have bought a site for a new mill to be built in addition to their present plant. Work will be started on the building within sixty days, and it is understood that contracts for machinery have not been placed. The new mill will probably contain about 15,000 spindles, which will double their output.

—*Pennsylvania, Pottstown. Gudebrod Bros., of the Champion Silk Mill, have awarded a contract for an addition 30x90. New machinery will be put in, and the number of operatives increased by 50.

—Pennsylvania, Phillipsburg. We note the report that the Standard Silk Mill Co. is to build an addition to its mill.

—*Pennsylvania, Scranton. Reiling, David & Schoen, silk manufacturers, who are now building a large addition to their mill here, have decided to put on a further addition, 50x80, two stories. It is thought that the entire plant will be running by July 1st.

Miscellaneous.

New Mills.

—California, San Francisco. An effort is being made here to interest capital in the building of a new factory for making hemp and twine. Already $30,000 has been promised. John Center, of San Francisco, has subscribed $20,000. At Gridley, Butte County, 400 tons of hemp were raised in 1897. The directors of the Manufacturers and Producers' Association has this subject under investigation.

—*Kentucky, Paducah. The new mill of the Cohankus Mfg. Co., of Hohokus, N. J., is rapidly nearing completion. Shipment of machinery from the New Jersey plant has already begun, and it is thought that the mills will be started up May 1. The company manufactures jute rope and yarn. The plans are by architect Samuel Hanniford & Son, Cincinnati, Ohio. F. P. Toof will be superintendent of the mill, and can be addressed at Box 234 Paducah, Ky.

—Pennsylvania, Norristown. Architect Edwin F. Bertolette, Heed Bldg., Philadelphia, has plans and specifications for a factory and dyehouse for L. A. Taubell, to be built at Arch and Thames Sts., Norristown. The mill is 50x120. The dye house 60x100.

—*Pennsylvania, Philadelphia. W. & R. Ford, at present located at Orchard and Mill Sts., are to build a new jute factory at Torresdale Ave. and Tacony St., Frankford. The main building will be 55x243, with one story wings, 30x40 and 50x100, to be used as boiler house and picker house, respectively. Robert Beatty & Bro. have the building contract.

Enlargements and Improvements.

—*Connecticut, Westville. The Pond Lily Co. informs us that they will build a new structure in addition to their present plant, which will give employment to 40 or 50 hands. The work has just been started on this building, and they expect to have the same in operation with new machinery soon after March 1. They have a large business in general dyeing for the trade of cotton piece goods. Wm. H. Forsyth is president; C. R. Whedon, treasurer; Henry Barnes, secretary.

Mills Starting Up.

—Ohio, Zenia. It is reported that the Bradley Twine & Cordage Works, whose plant was recently destroyed by fire, will buy the American Cordage Mill in Zenia, and put same in operation in order to fill the orders which they had on hand at the time of the fire.

Fires.

—New York, Little Falls. The Little Falls Knitting Co.'s Mill, which was damaged by fire Jan. 29th, was insured for $150,000.

—Ohio, Dayton. The Bradley Cordage Co.'s plant, at 454 E. Hoffman Ave., was almost totally destroyed by fire Feb. 8th. Loss is estimated at $75,000.

—Pennsylvania, Ardmore. Fire occurred in the card room of Thomas Clegg & Co., recently, causing a loss of $2200. Insured.

—Pennsylvania, Mifflintown. The carpet factory of Kauffman & Harley was destroyed by fire, Feb. 3rd, entailing a loss of about $5,500. It is covered by insurance. The factory, which was crowded with orders, will be rebuilt at once.

—Province of Quebec, Way's Mills. The woolen mill owned by Shurtleff & Nunns, of Coaticook, was destroyed by fire January 31. It is now understood that they will be rebuilt.

—Rhode Island, Lonsdale. A fire in the picker room of the Lonsdale Co., February 7, caused about $4,000 damage.

—Rhode Island, Thornton. The fire in the British Hosiery Mill, February 17, caused damage to the extent of about $5,000.

—Virginia, Winchester. The Redbud Woolen Mills, operated by Kern, Barr & Walter, were recently burned. Loss, $12,000; insurance $2,500. The building and machinery are actual loss.

—Wisconsin, Genessee. The three-set woolen mill, owned by James Proctor, was destroyed by fire Feb. 23rd. Estimated loss, $25,000. No insurance.

Facts and Gossip.

—Illinois, Chicago. The Western Shade Cloth Co. has increased its capital stock from $20,000 to $50,000.

—Wisconsin, Janesville. The Janesville Cotton Mills are now running their Monterey mill to its full capacity. There is some talk that their large mill on North Franklin St. may be started up. The strike at the New England mills is the cause of this boom in business for them.

—*Alabama, Cottondale. The mill of the Tuscaloosa Mfg. Co., formerly operated by Friedman & Lovemen, which has been idle for nearly two years, was sold to-day by A. S. Vandergrift, representing George A. Searcy and H. M. Somerville, trustee for the bond holders. The purchaser was Dave Rosenau, Northport, Ala., the price being $44,700 for the plant, and $400 for equity of redemption, bought in by J. S. Handley, bond holder. It is understood that Mr. Rosenau will put the plant in operation soon.

—Connecticut, Fairfield. The Norwalk and Fairfield Woolen Mills were recently incorporated at Trenton, N. J. Capital, $100,000. The incorporators are Julius B. Lorge, Lewis Hollingsworth, New York, and Sidney Alberti, Norwalk, Ct.

—Georgia, Columbus. The successful reorganization of the Eagle and Phoenix Mill will probably be accomplished. Eight hundred owners, out of a total of 892 bonds have agreed to enter into the new plan, which is to buy the property at the up-set price of $500,000. This sale will be made about May 1. It is thought that Gunby Jordan, the present receiver, will be elected president of the reorganized company.

—Kentucky, Owensboro. A serious accident was narrowly averted recently at the Owensboro Woolen Mills, which recently started up. Someone entered the building and removed nuts from the governor, and also from the engine bolts, and in some way disarranged the electric plant. The engineer made the discovery just in time to avoid a serious accident.

—*Massachusets, Hudson. We wish to correct a statement which was made in the Textile Advance News of December 31, and in the January Textile World, which gave the impression that the Hudson Worsted Co. and the Hudson Spinning Co. were the same concern. They are entirely distinct and separate. The Hudson Worsted Co. has been established for a number of years, under the management of J. L. Ballantyne (wool scour-

ers and combers). The Hudson Spinning Co. was organized last December, by Joseph Watmaugh (commission spinning of worsted yarns).

—Massachusetts, Mansfield. James A. Lind and Robert Lind, are now operating the Mansfield Print Works, having dissolved partnership. James A. Lind will continue the business under the same name, Mansfield Print Works, at Malden, Mass.

—*Massachusetts, New Bedford. At the stockholders' meeting of the Bennett Spinning Co., capital $1,800,000, the following officers were elected: President, Andrew G. Pierce; treasurer, James E. Stanton, Jr.; directors, Andrew G. Pierce, Edward S. Brown, Loum Snow, Clarence A. Cook, of New Bedford; Chas. J. Holmes, of Fall River; Stephen M. Crosby, of Boston, and Robert W. Taft, of Providence.

—Massachusetts, Worcester. The total award of $70,048.91 has been made to the Lakeside Mfg. Co. and Mrs. Harriet N. Kent, on their claim against the city of Worcester for damages to their water power.

—Minnesota, Albert Lea. Jorgen Jensen, who has purchased the Albert Lea Woolen Mil that is now idle, anticipates beginning operations early in the spring.

—Minnesota, St. Paul. The Northwestern Dyeing, Cleaning & Finishing Co. has been incorporated with a capital stock of $10,000. The incorporators are: Frank J. and Louis Rochex, of this place, and W. R. Diamond, of Duluth.

—*New Jersey, Lodi. The Boettger-Pierce Dye Works, of which we have made previous mention, filed articles of incorporation Feb. 2nd. The capital stock of the company is $100,000.

—New Jersey, Mt. Holly. Regarding the removal of Bidwell & Hughes from Germantown to Mt. Holly, we are now informed that the company has built its new mill out of their own capital. They manufacture hammocks, school bags, horse cottonettes and toweling.

—New Jersey, Paterson. The Kerwin and Warburton Silk Co. has been incorporated; capital stock, $100,000, $7,000 paid in. The incorporators are John J. Kerwin, Thomas B. Warburton and Thomas Mahoney.

—*New York, Gloversville. The Gloversville Knitting Co., which increased its capital stock recently, informs us that this increase is for working capital only, and no change in the plant is contemplated.

—*New York, Sherburne. It is now an assured fact that C. Farrel Allis & Co., of Utica, N. Y., lessees of the Sherburne Knitting Mill, have made satisfactory arrangements with the R. R. Co. and as soon as some necessary repairs are made, will put the plant in operation. It is said that old operatives in the mill will be given the first chances of work.

—*New York, Utica. Regarding the reported change in production at the Utica Steam Cotton Mills, the company informs us that there will be no special difference in their production from the past. They are simply putting in new carding and spinning machinery, replacing old, and selling surplus yarns to hosiery manufacturers.

—Pennsylvania, Spartanburg. It is reported that the woolen mill of Harvey Lamb, at this place, has been bought by M. L. Tauber, of Cumberland, Md., who will soon take possession and equip with modern machinery. This is a small mill, 3 looms, 200 woolen spindles.

—*Rhode Island, Apponaug. The mill of the Apponaug Dyeing, Bleaching & Printing Co., which was recently reported as bought by Charles I. Rawson, of Oxford, Mass., will now be operated by a company known as the Apponaug Print Works, which has been incorporated. The incorporators are: John W. Travis, Boston; Charles I. Rawson, Oxford, Mass.; J. Warren Lander, Warwick. Capital stock is $100,000.

—Rhode Island, E. Greenwich. At a meeting of the corporation known as the Bourne Bleachery, recently held, it was unanimously voted that the name be changed from the Bourne Bleachery to the Greenwich Bleachery. An application has been made to the commissioner of corporations to authorize this change in name.

—Rhode Island, Woonsocket. Wages of weavers at the Dunn Worsted Co., have been increased 10 per cent.

—South Carolina, Rock Hill. The property of the Globe Cotton Mill, which has been in the hands of a receiver for some time, was sold recently by receiver J. R. London, for $40,000. The purchasers were an association of gentlemen from New York and Rock Hill, the latter being A. F. Ruff, A. Freidheim and C. W. Frew. It is probable that the company will be organized and the mills operated.

PERSONAL RECORD.

Cotton.

—H. H. Sutcliff, recently of Philadelphia, is now designer for the Riverdale Cotton Mills, Great Barrington, Mass.

—Joseph Marsden has taken the position as overseer of the corduroy and plush department at the Merrimack Mfg. Co., Lowell. He was formerly second hand under Thomas Wood, who resigned.

—Thomas Wood, who recently resigned as overseer of the plush, corduroy and velvet department of the Merrimack Mfg. Co., Lowell, for a position in R. I., was given a reception by his former employees and presented with a handsome silver service.

—Ernest C. Johnson has succeeded to his father's position as boss dyer at the

Metheun Mills, the latter having gone with the Pemberton Co., Lawrence.

—Since Agent Lewis E. Barnes has taken charge at the Pemberton Mills, Lawrence, the following changes have been made: James R. Bailey, Jr., has succeeded Roscoe S. Mulliken as superintendent, Chas. A. Johnson, from the Methuen Mills, has succeeded Thos. McEneaney as boss dyer.

—W. H. Connor, recently at Anthony, R. I., has accepted a position as boss winder with the Elmira Knitting Mills, Elmira, N. Y.

—M. P. Dupray took charge of the weaving in the Gloucester Cotton Mills, Gloucester City, N. J., (505 looms) on January 24th. The superintendent is R. M. Griffith.

—A. T. Green overseer of the carding in Massachusetts Co.'s Prescott mill, Lowell, Mass., has retired after 27 years of service, and is succeeded by W. R. Erskine, formerly scond hand in the company's No. 1 mill.

—E. Clifford has become superintendent of the big Whitney cotton mill at Whitney, S. C.

—Stephen T. Hall, son of Hon. Thos. A. Hall, superintendent for twenty years for the Briggs Mfg. Co., at Rockville, R. I., was on January 1, 1898 promoted to the position as foreman of the Drawing Frame and Speeder Fitting Department of the Howard & Bullough American Machine Co., Ltd., of Pawtucket, builders of cotton machinery. Mr. Hall was formerly at the mill with his father where by practical experience he learned the art of cotton manufacture previous to his learning the machinist trade. Later he became a draughtsman. His many friends wish him success in nis new position.

—Joseph Lacrosse has secured a position at Moosup, Conn. He was formerly overseer of the spinning at B. B. & R. Knight's mill, Fiskeville, R. I.

—George Marsland overseer of the mule spinning department of the Ashton (R.I.) mills operated by the Lonsdale Company has resigned, having been with them over twelve years. Jonn Ferguson will succeed him, who formerly was in the spinning department, having charge.

—George E. Dexter has resigned as overseer of ring spinning in the No. 4 mill of the Lonsdale Co., Ashton, R. I.

—Thomas Crumley has resigned as overseer ring spinning at the Ann & Hope Mills of the Lonsdale Co.

—Edward Lynch, superintendent for many years of the Union Cotton Manufacturing Company, Fall River, Mass., has resigned his position. John Sullivan has taken his place.

—Joel B. Ricker has resigned as superintendent of the Springvale (Me.) Cotton Mills Company, which position he has held for the last 16 years. Henry J. Holbrook, of New York, will succeed him.

—J. M. Hodgdon, overseer of the weaving for the last 25 years at the No. 3 Mill of the Manchaug (Mass.) Company, has resigned his position. Joseph Conn is to take his place and John Peale, of Fall River, Mass., is to be the overseer at the No. 1 Mill.

—Charles J. Trippe, who has been overseer of the night carding and spinning with the Cherokee Falls Mfg. Co., Blacksburg, S. C., has taken a position as overseer of spinning with the Monroe Cotton Mills, Monroe, N. C.

—John C. Tiddy, who has been second hand in the card room of the Gaffney Mills, Gaffney, S. C., is now night overseer of carding in the Spray Mills, Spray, N. C.

—W. J. White has resigned his position as travelling foreman for George Draper & Sons, Hopedale, Mass., and taken a position as superintendent of the Fairmount Cotton Mills, Fairmount, S. C.

—Frank Grover has been appointed superintendent of the Uncasville Company's cotton mill, Uncasville, Ct., in place of the late Chas. I. Spalding.

—Maine, Lewiston. At a meeting of the full board of directors of the Hill Mfg. Co., Mr. Homer B. Richardson, eldest son of the late F. L. Richardson, was elected treasurer to take the place left vacant by the death of his father. Mr. Richardson leaves the employ of Messrs. Amory, Browne & Co., of New York, to start at once at his new duties.

—James Young has become general superintendent of the G. W. Hallerson Cotton Mills Co., Concord, N. C., having resigned as superintendent of the Saxe-Gotha Mills, Irene, S. C.

Woolen.

—James Collins, assistant dyer for several years at the Riverside Mills, and recently as boss dyer at Fulton, N. Y., has taken a position at the new Earncliff Mill, Providence, R. I., as boss dyer.

—Mr. Hollingsworth superintendent of the National & Providence Worsted Mills, has resigned.

—Samuel Hood has succeeded Joseph Winterbottom as overseer of carding for the Bromley Bros. Carpet Co., Philadelphia, Penn.

—Simon Taylor has accepted a position as superintendent in Spencer, Mass. He was formerly with the Riverside Woolen Co., Stafford Springs, Conn.

—E. E. Phelps has resigned as boss finisher at the Clinton Mills Co., Norwich, Conn., and will go to Stafford. Fred H. Greene succeeds him. Hiram Rathburn is supt.

—Robert Batstone, of Dalton, Mass., has accepted a position as boss finisher for the New England Co., Rockville, Conn. G. M. Ward, formerly of Staffordville, Conn., has succeeded him.

—Hartley Beaumont, recently with the Linwood Mills, No. Adams, Mass., has accepted a position as designer with the new Brock Worsted Mills, at Taylor, Pa.

—D. S. Knight, so long well known as boss weaver for the Cheshire Mills, Harrisville, N. H., has resigned his position to take charge of the weave room of the George H. Gilbert Manufacturing Co., of Gilbertville, Mass.

—H. Marco has accepted a position as dresser tender with the U. S. Bunting Co., at Lowell, Mass.

—M. S. Dixon, superintendent at the Warren Woolen Co.'s mill at Stafford Springs, Conn., will leave for Mechanicsville, to take charge for the French River Textile Co. He has been in Stafford Springs only a few months, but during that time a large circle of friends has become attached to him and family.

—William M. Lasbury is now agent of

the Broadbrook Company, having been promoted from assistant's position.

—John McGill has resigned his position as boss finisher for the Algonquin Co., Passaic, N. J., to accept a similar position with the Wilson-Horton Co., of Pittsfield, Mass. His former assistant, James Wall, succeeds him in the Algonquin Mill. He was presented with a gold-headed cane by John Coffey in behalf of his former help. Mr. McGill leaves many friends in Passaic.

—C. Fred Waterman, lately connected with the Lorraine Maufacturing Company of Pawtucket, R. I., has been appointed head bookkeeper at the mill of the French River Textile Company, Mechanicsville, Conn.

—Jacob Sears for years a wool carder in the mills in Philadelphia and Delaware County, and later at the mill of Yarnell & Sons, South Chester, Pa., and of the Byram Manufacturing Company, Thurlow, Pa., died recently at South Chester, aged 69 years. A widow, one son and two daughters, survive him.

—L. D. Green has accepted the position of superintendent with the Muskingum Valley Woolen Manufacturing Company, Dresden, Ohio.

—J. M. Lowry, who has been overseer of weaving at Palmetto, Ga., has accepted a position with the Fulton Bag & Cotton Mills, Atlanta, Ga.

—John Martin, assistant machinist, and four Italian laborers were badly injured by the fall of a freight elevator in the Raritan Woolen Mills, Raritan, N. J., Jan. 11th.

—John McLaren of East Greenwich, R. I., will be overseer of weaving at the woolen mill at Phoenix, R. I.

—At the annual meeting of the stockholders of the Dayville Woolen Co., Killingly, Ct., held recently, the following officers of the company were elected: president, Charles Bard; secretary, C. A. Russell; treasurer, Julius B. Luge; agent and general manager, Daniel A. Taylor; assistant treasurer, F. W. Bennett. Julius B. Luge of the commission house of Wm. Iselin & Co., New York, continues as selling agent, and Mr. Taylor takes the place of R. H. Hart, resigned.

—Louis Pickard has resigned his position with the Thomas Kay Woolen Mills, Salem, Ore., and will do the dyeing for the Provo City Mills, Provo City, Utah.

—G. Pfeifer, formerly with R. M. & Theo. Reynolds, Monson, Mass., is superintendent of the Faulkner Woolen Mills, Lowell, Mass.

—John Rochelle has resigned as overseer spinning and twisting with Wm. Broadhead & Sons, Jamestown, N. Y., and gone to Mt. Holly, N. J.

—Walter R. Markham has resigned as overseer of the packing room of the Rockfall Woolen Co., Middletown, Ct.

—Mark Tempest of Olneyville, R. I., has taken a position as boss carder in Lebanon, N. H.

—D. F. Welch, S. Windham Me. has taken a position as finisher with the Faulkner Woolen Mills, Lowell, Mass.

—John B. Livsey, who has been at Allenton, R. I., has taken a position as overseer carding in the Bernon Mills, Georgiaville, R. I.

—Henry Diner, who has been second hand of carding at the Merrimack Woolen Mills, Dracut, Mass., has taken a position as overseer carding at the Squam Lake Woolen Mills, Ashland, N. H.

—James Dodd has resigned his position as overseer of weaving at the Clinton Woolen Mill, Clinton, Mich.

—Edward Ward has resigned as dresser tender at the New England mill, Rockville, Ct., and taken a position as overseer of dressing with the Broad Brook Co., Broad Brook, Ct.

—Fred White of Chepachet, R. I., has taken a position as boss carder for the Yucon Woolen Co., Elmville, Ct.

—John J. Rohrbacher, formerly of Des Moines, Io., is at present stopping with his son, who is overseer of the spinning department in Greaves & Son's woolen mill, Lacon, Ill.

Samuel Wilson has resigned from the finishing department at the Plymouth Woolen Co., Plymouth, Mass., and is now overseer of finishing at the Hopeville Mills, Worcester.

—Jas. J. Guy is now boss finisher with W. J. Dickey & Sons, Oella, Maryland.

—Maine, Warren. The directors of the George's River Mills have appointed George W. Walker to succeed his father, the late Thomas Walker, as superintendent.

Knit.

—Edward W. Thomas has resigned as treasurer of the Shaw Stocking Co., Lowell, Mass., and his successor is W. E. Hall of Bondsville.

—Samuel Dyer has resigned from the Walter Aiken's Sons Mill, Franklin Falls, N. H., after 30 years' service.

—F. W. Briggs has secured a position as general foreman with the Keystone Knitting Mill, a new concern at Lititz, Pa. He was formerly boss knitter at the Beaver Mills, Little Falls, N. Y.

—David M. Ranken has accepted the position as superintendent in the New Britian (Conn.) Knitting Company. He was formerly superintendent of the Star Knitting Company of Cohoes, New York, and has succeeded E. W. Schultz.

—William Killoran has resigned his position as foreman of the rib knitting department of the Parsons Mfg. Co., and is succeeded by Wm. Daw.

—David Abeel, Jr., has taken a position as foreman knitter with Daniel I. Devoe, Fort Plain, N. Y.

—A. P. Ward is now superintendent of the knitting mill of the Hanson-Crawley Co., Barnesville, Ga.

Miscellaneous.

—E. R. Lawson has resigned his position as dyer at the Lowell Bleachery, Lowell, to accept a position at the Great Falls Bleachery at Somersworth, N. H. Mr. Jewett, who has been the second hand, will take his place. Mr. Lawson was presented with a Morris chair from the employees.

—New Hampshire, Somersworth. W. S. Lawson, who has been dyer for the Great Falls Bleachery & Dye Works, has been appointed superintendent. His brother, Edward Lawson, of Lowell, will take the position vacated.

Alizarine Black

(PATENTED)

Distinguished from all other blacks by the acid test . . .

It is an acknowledged fact that woolen goods for men's wear of American manufacture, due to the more general use of Alizarine Dyes (including the Alizarine Black), are faster in color and therefore give better service to the public than the foreign goods. This is of special importance in view of the fact that our climate with the clear skies and bright sunshine is more trying to colors than in England, Germany or France

Wm. Pickhardt & Kuttroff

NEW YORK

Marriages.

—William Sullivan, overseer of the cloth room of the Laurel Lake Mills, Fall River, and Miss Kate Hassey were married January 25th.

Deaths.

—George P. Rose, for ten years superintendent of the Niantic Woolen Mills at Flanders, Ct., died in Providence on January 27th, age 55 years.

—Alex B. Cowan, age 65, died January 15, in Springfield, Mass. He was at one time agent of the Chicopee Mfg. Co.

—Herman Marx, late designer for the Lymansville Co., Lymansville, R. I., was drowned on January 11th, while fishing. He was 40 years of age, and leaves a widow.

—Jacob New, ribbon manufacturer at 87 Greene St., New York City, died recently

—Albert E. Robinson, manager of the Robinson Mfg. Co., Oxford, Me. died at his home in that town Jan. 1st. Mr. Robinson was well known in the wool and woolen trade.

—Robert Morrison, for a long time superintendent of the Eureka Silk Co.'s mills at Canton, Mass., died Jan. 3rd, aged 53 years.

David O. Swire, a prominent Philadelphia carpet manufacturer of the firm of Swire & Scott, was killed Jan. 7th by being struck by a train on the Philadelphia & Reading railroad.

—Jacob Walder, the well known reed and harness maker, died on Dec. 30th at his home in Paterson, N. J. age 59. He came to this country from Switzerland in 1866, and settled in Paterson. A year later he started in business for himself, and since that time constantly increased his plant, until at the time of his death he had two large brick mills, one three stories high, 50x100, and the second one, built in 1889 in the rear of his residence, four stories high, 80x160 feet.

—P. R. Caswell, who has been master mechanic at the Lockwood Mill, Waterville, Me., died recently.

—Connecticut, Derby. Amos H. Alling, of the firm of A. H. & C. B. Alling, proprietors of the Paugasset Mills, died at his home, Feb. 6th, aged 75 years.

—Jos. D. Boyd, president of the J. D. Boyd Mfg. Co., Griffin, Ga., died January 23. It will be remembered that this company, which has manufactured fertilizer, we reported as to go into the making of cotton rope, twine and yarn.

—Christopher Lippit died at his home in Providence, R. I., Feruary 10. Mr. Lippit was born in Providence, in 1825. His father was largely interested in the Lippit Mills, and formed a partnership with Thomas Harris, and controlled the Phoenix and Lippit Mills for many years. He retired from business in 1875, on account of ill health. A widow survives him.

BUYERS' INDEX

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Architects and Mill Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Boiler Feeds.
D'Este & Seeley Co, 29 Haverhill St, Boston,

Automatic Feeds for Cotton and Wool.
Harwood, Geo. S, & Son, 53 State St, Boston.
Kitson Machine Co, Lowell, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Baling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Boston Belting Co., 256 Devonshire St., Boston, Mass.
Danforth Belting Co, 221 Chestnut St, Phila, Pa.
Fell, Geo. & Son, Bolton, England.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Ulmer Leather Co, Norwich, Conn.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Danforth Belting Co, 221 Chestnut St, Philadelphia, Pa.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbins, Spools, Shuttles, Etc.
Woonsocket Shuttle Co, Woonsocket, R. I.

Boiler Compounds.
Imperial Chemical Co, 324 St. John St, Phila, Pa.

Boxes, Paper.
Palmer, J. S, 35 Wistar St, Germantown, Pa.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braids.
See Tapes, Braids and Edgings.

Burr Pickers.
Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.
Ashworth, Elijah, Fall Biver, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.
Butterworth, H. W., Sons & Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Cloth Testing Machine.
McKnight, S, 771 Broadway, New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Commission Merchants.
Hayes, O. H, & Co, New York.

Copper Print Rollers.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
Revere Copper Co, 174 Oliver St, Boston.

Copper Work for Dyers.
Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.
Altemus, W. W, & Son, 2816 N 4th St, Phila-Pa.
Ashworth, Elijah, Fall River, Mass.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Kitson Machine Co, Lowell, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Payne, Geo. W, & Co, Pawtucket, R. I
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Cotton Openers and Lappers.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kitson Machine Co, Lowell, Mass.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.

Damper Regulators.
D'Este & Seeley Co. (Curtis), 29 Haverhil St, Boston, Mass.

Designers.
Fresnel, Gustave, 125 W. 56th St, N. Y.
Hand, F, & Co, Paterson, N. J.

Dryers.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.

Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Kensington Dye Works, Kensington, Pa.
Littlewood, G. J., & Sons, Manayunk, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln & Co, 54 Arch St, Hartford, Ct.
Parks & Woolson Machine Co, Springfield, Vt.
Phenix Iron Foundry, Providence, R. I.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E, & Co, 174 Purchase St, Boston, Mass.
Bird, F. J , 123 Arch street, Philadelphia.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Cochrane Chemical Co., 50 Kilby St., Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St., New York.
Farbenfabriken of Elberfeld Co, 77 William St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Holliday, Read, & Sons, 100 William St., New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros, J, 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 79 Murray St., N. Y.
Matheson, W. J, & Co, 178 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Phillips (Moro) Chemical Co, 131 S. 3d St, Phila., Pa.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.
Webster Dye Works, Webster, Mass.

Dyers and Finishers.
Boston Finishing Works, Williamstown Mass.
Brophy's Sons, T, Jasper St., above Clearfield St., Philadelphia.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Industrial Dyeing & Finishing Works, 3829-45 Frankford Ave, Philadelphia.
Oakdale Dye Works, 915 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyers' Clogs.
Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.
See Tapes, Braids and Edgings.

Electrotyping and Printing.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N.Y.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Salem Foundry & Machine Shop, Salem, Mass.

Embroidery Hosiery Machine.
Ahlstrom, O. J. 529 Broadway and 95 Spring St., New York.

Engineers, Mechanical.
Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.
American Express Co, offices in every city

Fans—Exhaust and Ventilating.
See Ventilating Apparatus.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Fulling Mills for Woolen Goods.
Hopkins, A, & Co. Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.
Boston Belting Co., 256 Devonshire St., Boston.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.

Index.
Burr Index Co, 336 Asylum St, Hartford, Conn.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Byram, F. A, Germantown, Pa.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Edgings, Germantown Phila, Pa.

Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.

Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2097 E. Cumberland St, Phila, Pa.

Knit Goods Brushers.

Ardrey, S. B, & Sons, Bristol, Pa.
Jones, Lewis, Philadelphia, Pa.
Musgrove, C. M., Plainville, Conn.

Knitting Machine Cylinders.

Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.

Boss Knitting Machine Works, 7th and Walnut Sts., Reading, Pa.
Branson Machine Co., 506 John St., Philadelphia.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Eckersley, Richard, N. E. cor. American and York Sts, Philadelphia, Pa.
Excelsior Knitting Machine Manufacturing Co., South Bethlehem, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Payne, G. W. & Co, Pawtucket, R. I. (Winders.)
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2097 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St, Phila, Pa.

Knitting Needles and Supplies.

Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co., Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Musgrove, C. M., Plainville, Conn.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.

Bullock & Crenshaw, 528 Arch St Phila, Pa.

Lamps, Electric.

Beacon Lamp Co, New Brunswick, N. J.
Lynn Incandescent Lamp Co., Lynn, Mass.

Looms.

Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1788 Barker St, Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers.

Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators.

Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.

Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.

Gerry, George, & Son, Athol, Mass.

Machinery Dealers.

Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L, 123 N. Front St, Phila,
Scott, James, 222 Chestnut St, Phila, Pa.

Machinery Wipers.

American Silk Mfg. Co, 311 Walnut St Philadelphia, Pa.

Machinists' Tools.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.

Walder, J, Paterson, N. J.

Measuring and Folding Machines.

Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mill Builders and Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.

American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Harwood, Geo. S, & Son, 53 State St, Boston.
Hill, Jas, Mfg. Co. Providence, R. I.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Spofford, Wm. S, & Son, 5-11 Culver St, Providence, R. I.
Stevenson Bros. & Co, 133 So. 2d St, Philadelphia, Pa.
Thurston, A. G, & Son. Fall River. Mass.
Watson, L. S, Mfg.Co, Leicester, Mass.

Napping Machines.

American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Parks & Woolson Machine Co, Springfield Vt.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Oilless Bearings.

N. American Metalline Co, 62 W. Ave. and 3rd St, Long Island City, N. Y.

Oil Filters.

Burt Mfg. Co, Akron, Ohio.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Paints.

American Fire Resisting Paint Co, 17 Broadway, New York.
Devoe & Reynolds, Fulton and Williams St, New York.

Pantagraphs for Mill Engraving.

Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.

Crosby & Gregory, 24 School St, Boston, Mass.

Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.

Dairymple, George, Fair Haven, Vt.

Peroxide of Sodium.

Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.

Loom Picker Co., Biddeford, Me.
Smith, Lee, & Co., Knoxville, Tenn.

Picking, Carbonizing and Garnetting.

Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills 2025 Naudain St., Philadelphia.

Pipe Covering (Magnesia).

Keasby, R. A, 54 Warren St, New York.
Keasby & Mattison Co. Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave, Boston, Mass.

Pneumatic Conveying.

See Ventilating.

Power Transmitting Machinery.

Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.

Presses.

Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressure Regulators for Steam and Water.

D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass.

Printers and Embossers.

Novelty Textile Printing Co, 447 449 W. 14th St, New York.

Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.

Reed and Harness Manufacturers.

American Supply Co, Providence, R. I.
Gowdey, J. A, & Co, Providence, R. I.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.

Cheney Bros, S. Manchester, Ct.

Roller Skins.

Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.

Armitage Mfg. Co, Richmond, Va.
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.

Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.

Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Saddles, Stirrups and Levers.

Dixon Lubricating Saddle Co, Bristol, R. I.

Sample Cutters.

Gleason, A. H, Rockbottom, Mass.

Schools.

Gavey Correspondence School of Textile Design. P. O. Box 222, Brooklyn, N. Y.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.

Curtis & Marble Machine Co, Worcester, Mass.
Dinsmore Mfg. Co, Salem, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co , 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

Shearing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.

Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.

See Wool Shoddies

Shuttles.

See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.

Cutterworth, H. W. Sons Co., Philadelphia.
Brompton & Knowles Loom Works, Worcester, Mass.

Singe Plates.

Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Ms.

Sizing.

American Glutrose Works, Penn Mutual Bldg, Phila, Pa.

Slashers.

Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.

American Soap & Washolene Co. Cohoes, N. Y.
Holbrook Mfg. Co., 406 Washington St., N. Y.
India Alkali Works, Boston.

Spindles.

Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.

Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.

Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.

See Cotton Machinery.

Spinning Rings.

Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinners' Supplies.

Dixon Lubricating Saddle Co, Bristol, R. I.

Spinning Tubes.

Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.

Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.

Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Damper Regulators.

D'Este & Seeley Co, 29 Haverill St, Boston Mass.

Steam Engines.

Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Reutschler Co, Hamilton, O.

Steam Separators.

D'Este & Seeley Co. (Curtis), 29 Haverill St., Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.
D'Este & Seeley Co, 29 Haverhill St, Boston
Haines, W. S. C 136 South 4th St, Phila, Pa.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Traps.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass. (return float and expansion).
Haines, W. S. C 136 South 4th St, Phila, Pa.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2340 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Germantown, Pa.
Krout & Fite Mfg. Co., 2632 40 Mascher St., Philadelphia.
Perseverance Mills, 2632-40 Mascher St. Phila, Pa.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Teasels.
Kellogg, Wm, W, Skaneateles, N. Y.
McLaughlin Bros, Skaneateles Falls, N. Y.

Temperature Regulators.
D'Este & Seeley Co, 29 Haverhill St, Boston.
Haines, W. S. C, 136 South 4th St, Phila, Pa.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Valves.
D'Este & Seeley Co, 29 Haverhill St, Boston Mass.

Ventilating Apparatus.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Massachusetts Fan Company, Room 641, 53 State St, Boston.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watches.
Elgin, National Watch Co., Elgin, Ill.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116A Chambers St, New York.

Water Pressure Regulators.
D'Este & Seeley Co, 29 Haverhill St, Boston.

Water Wheels.
Bradway, C. P, West Stafford, Conn.
Christiana Machine Co, Christiana, Pa.
Humphrey Machine Co., Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, W. Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Payne, G. W. & Co, Pawtucket, R. I.
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich

Wool.
Lyon, John H, & Co, 12 Reade St, N. Y.
Webb, Chas. J. & Co, 156 N. Front St. Phila Pa.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crabb, Wm, & Co, Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Townsend, Thomas, 157 Orange St, Providence, R. I.

Wool Extracts.
Daly, Jas. E., Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Sullivan, R. T, 180 Summer St, Boston, Mass.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
Butterworth, H. W. Sons Co., Philadelphia.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Harwood, Geo. S, & Son, 53 State St, Boston.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kitson Machine Co, Lowell, Mass.
Parks & Woolsen Machine Co., Springfield, Vt.
Payne, G. W. & Co, Pawtucket, R. I.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.
Woonsocket Napping Machine Co., Woonsocket, R. I.

Wool, Hair and Noils.
Fowles & Co, 106 Church St, Phila.
Webb, Chas. J., & Co, 142-156 N. Front St., Phila., Pa.

Wool Shoddies.
Bowers', James, Sons, Ltd, Chester, Pa
Daly, James E, Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Riverdale Woolen Co, Riverdale, Northbridge, Mass.

Wool Sorters and Scourers.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.

Wool Washing, Preparing and Drying Machinery.
Kitson Machine Co, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Yarns, Threads, Etc.

Banding.

Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
White, James F, & Co, N. Y. and Phila, Pa.
Whittier Cotton Mills, Lowell, Mass.

Carpet Yarns.

Fleming & Chapin, 229-231 Church St, Phila, Pa.

Cotton Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Burnet & Co., 24 George Sq., Glasgow, Scotland.
Catlin & Co, New York and Boston.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Germantown Spinning Co, Germantown. Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York City.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Tucker & Cook Mfg. Co, Conway, Mass.
White, James F, & Co, 54 56 Worth St, N. Y.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.
King, Alex, & Co, 54 Leonard St, New York.

Glazed Yarns.

Blodgett & Orswell, Pawtucket, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Indian Orchard Co., Indian Orchard, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Fawcett, Hughes, 115 Franklin St., N. Y.
Hadley Co, 95 Milk St, Boston, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex. & Co, 54 Leonard St, New York.
Moore, C, & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St. Boston, Mass.
Boyer, B. F, & Co, 516 Market St. Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Clark, Wm. Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Cohannet Mills, Taunton, Mass.
Eichmann & Sternberg, 530 Broadway, cor. Spring St, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Holland & Webb, 478 Broadway, N. Y.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York.
Mitchell, James E, & Co, Phila. and Boston.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Rockwell, E. M, Leominster, Mass.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
White, James F, & Co, 54-56 Worth St, N. Y.
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

Burnet & Co., 24 George Sq., Glasgow, Scotland.
Eichman & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fawcett, Hughes, 115 Franklin St., N. Y.
Holland & Webb, N. Y.

Mohair Yarns.

Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Holland & Webb, New York.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Burnet & Co., 24 George Sq. Glasgow, Scotland.
Cranston Worsted Mills, Bristol, R. I.
Eichmann & Sternberg, New York City.
Holland & Webb, New York.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St , N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E. Mfg. Co , Pawtucket, R. I.
King, Alexander & Co, 54 Leonard St, N. Y.
Rockwell, Edward M, Leominster, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Botany Worsted Mills, Passaic, N. J.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Phoenix Mills Co, 13 Letitia St, Phila. Pa.
Sawyer, Manning & Co., 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

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Now and Then

YOU need such goods as OIL EXTRACTORS, STEAM SEPARATORS, ENGINE INDICATORS, EXHAUST HEADS, SHAKING GRATES, etc. Why not get our catalogue before ordering.

JAMES L. ROBERTSON & SONS.

204 Courtlandt St., N. Y. 12 Pearl St., Boston

SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD, or inquiries concerning them may be addressed directly to "Information Department, TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

1349 **Woolen Supt. or designer.** Has been 12 years superintendent of 20 set mill in Conn., until recently, when he resigned on account of children's schooling. Has also been designer and pattern weaver. High character and first-class ability. Age 39; American, married. Experience on worsteds, cassimeres, cheviots, ladies' fancy dress goods, etc.

1170 **Woolen Superintendent** wants a position as superintendent and designer of a small mill, or superintendent of a large mill. Age 54; marrried. Don't want a position in any of the Southern or Western states. Has worked on a great variety of goods, and can refer to reliable parties.

1258 **Woolen** Superintendent, Carder, Spinner or Weaver. Has experience in dyeing. Is a reliable man. 40 years old. Refers to responsible parties as to character and ability.

1203 **Superintendent, Woolen,** or superintendent and designer. Age 39; married. Has held a position as superintendent 9 years; 2 years in one mill and 7 in another. Has good references. A good man on meltons, overts, cassimeres, worsted and kerseys; also serges.

1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

1305 **Superintendent and Designer** with 20 years' experience in woolen mills, on cassimeres, cheviots, worsteds and cloakings. Is now out of employment. Wants position at once.

1290 **Manufacturer from Scotland** wishes situation as superintendent; thoroughly practical in Scotch tweeds, cheviots, Saxonies, plaids, etc., from wools to finished cloth. Will start with small salary.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

1239 **A man who understands the** manufacturing of woolens in all the details, is open for an offer. Is an experienced manager, and is at present in charge of a mill that is being run at a profit.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1231 **Manufacturer.** One who has had a thorough experience in the management of a mill of his own, and who can show proof as to his ability, is now in the market for a position as superintendent or assistant superintendent with any good company. Age 40; married.

COTTON SUPERINTENDENTS.

1337 **Assistant Superintendent.** Expert on book binder's cloth, window shades, fan cloths, friction callender machines. 20 years with Wilson & Bentleys, London, and about 2 years employed in this country. Age 45, married. American and English references.

1332 **Supt. with long experience** in both Northern and Southern mills. Has started 3 Southern mills, on print cloths, broad and narrow sheetings and fine shirtings. First class references from all past positions. Age 48. Might accept position as overseer of large weave room.

1265 **Superintendent** wants position as superintendent of cotton cloth mill. Has had charge of each department in the mill; aged 28 years; married.

1266 **Cotton** superintendent wants position. Out on account of mill shutting down. Understands fancy and plain cottons, white and colored. Has a first-class record.

1267 **Cotton** superintendent or carder. Prints, sheetings, ginghams, fine and coarse, white and colored. Nearly all kinds of machinery. References all right. Age 47; married.

578 **Cotton Superintendent** with experience as boss carder, master mechanic and superintendent on prints, sheetings, twills and sateens. An American of high character, and whose ability is proved by past record. Age 35, married; can accept position at once.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

WOOLEN CARDERS.

1358 **Wool Carder,** now employed as second hand in large mill. Highly spoken of by past employers, habits, character and ability A1. Capable of taking charge of a room. Experience on high and low grade stock. Age 27, American, married.

1357 **Woolen Carder** now employed in satinet mill, has had 11 years' experience on fine goods and wishes to get back to that work; qualified to take a first class job. Age 39, English, married.

1307 **Carder** with unusually fine record and very wide experience desires good position in New England, Central or Western States. First-class references from past positions. Age 44. Experience on cassimeres, cheviots, dress goods, broad-cloth, repellants and blankets.

1309 **Woolen Carder.** 21 years' experience in charge at first-class mills. Has worked on fancy cassimeres, cheviots, meltons and kerseys. Age 45; married. At present out of work.

1230 **Superintendent or Carder and** spinner wants position in woolen mill. Age 30; married. Can take position at once. Familiar with jeans, cassimeres, flannels, knit goods and shoddies.

1347 **Woolen Carder.** Seventeen years' experience. Cassimere and hosiery yarns. Age 39, married; well recommended. Mill where last employed shut down.

1321 **Boss Carder.** Over 30 years experience in woolen mills. American. Will except second hand position in large mill. Well up on dress goods, broadcloths, flannels, kerseys, etc. Has best references.

1314 **Woolen Carder.** American. Age 30. Married. At present employed. Experience on beavers, cassimeres, cheviots, dress goods. Well spoken of by former employers. A first class man for a small mill.

COTTON CARDERS.

1339 **Cotton Carder,** young man holding first-class position in New York State, would like position in Eastern or Middle States as assistant superintendent or boss carder paying $5.00 or more a day. Is worth that salary; experience and references of the best.

1277 Young Frenchman, with wide experience and good references, wants position as boss carder. Age 38; married.

1138 Second hand of cotton carding wants position. Has had a good experience in that position. References.

1260 **Young Man** who has worked up through carding rooms of some of the best mills in New England, wants position as overseer in New England or Middle States. Age 27. Not married

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and speeders. Best references.

1320 **Cotton Carder.** 12 years' experience as overseer in first class mills. Can refer to well known mill men. Age 39. Married.

WOOLEN SPINNERS.

1299 Woolen Spinner who has had experience as second-hand would like a position as boss spinner. Would accept small salary to start. Has worked on sloakings, dress goods and Scotch tweeds in New England mill.

1287 **Young Man** wants position as boss spinner. Experience in first-class mills on cassimeres, kerseys, cheviots, satinets; knows Davis & Furber, Paul and Johnson & Bassett machines. Age 29. Wife works in mill.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1112 **Overseer of Woolen Spinning** wants position. Has first-class references. Age 37. Wages reasonable. Will accept second hand's position.

1276 **Spinner,** woolen. Wool and shoddy from 1-2 to 10 run, cassimeres, flannels, dress goods, underwear and blankets. Davis & Furber, Furbush & Sons, Johnson & Basset, and Schmidt machinery. Good references.

1204 **Situation wanted** as boss spinner, or second hand and mule fixer on Platt mules. Many years experience on yarns for dress goods in England, and also yarns for fine woolen cloth. 35 years old and married; good references.

1316 **Overseer Worsted Drawing** and spinning. Will accept first class position at $3 or more per day. At present employed in well known and first class mill. Age 42. Married. Best references from former employers.

COTTON SPINNERS.

1284 **Eleven years as Overseer** in first class gingham mill, with other experience, has fitted this man for good position in charge of ring spinning, spooling and warping. Age 40. French American; married.

1223 **Wants position as Overseer of** Spinning or Twisting, or both. Familiar with fine or coarse numbers. Refers to past and present employers.

1272 **Second Hand** of cotton ring spinning wants position in Massachusetts, Rhode Island, Maine or New York. Age 23; married.

1364 **Cotton Spinner, mules or frames** Early training in England, 5 years in New England mills, yarn 20s to 120s. Because of misfortune would accept second hand job. Excellent reference for character and ability. Age 32, married.

1350 **First-Class Ring Spinning** overseer, also spooling, warping, slashing, web drawing; large experience, highest references as to skill, character and executive ability. At present employed in Fall River. Age 48, American.

1344 **Mule or Frame Spinner,** is at present employed in first-class print cloth mill in New England, where he has been for 9 years. Can take charge of room Age 28, married; good references from present place. Wants $3.00 or more.

WOOLEN WEAVERS.

1340 **Worsted Weaver** would like position in a small mill at moderate salary; experience as fixer and in cloth room. Age 38, married. Knowles and Crompton looms; references good.

1253 **Weaver, Designer or Superintendent** Open for a position. Refers to past and present employers. Aged 47; married. Worsted cloakings, cassimeres and dress goods.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1273 **Woolen** weaver wants position. Age 35; married. A first class man.

1313 **Woolen Weaver.** First class references, and experience on fancy cassimeres, kerseys, beavers, dress goods, etc. At present not employed, for good reasons. Age 44. Married.

140 **Worsted Weaving Overseer** with 12 years' experience as overseer, designer, and superintendent. Has tried another business for a few months and now wants to go back to the mill. Excellent references, habits all right. A skillful weaver and manager. Age 33, married, American.

COTTON WEAVERS.

1297 **Overseer of Weaving.** A man of the very best standing desires a permanent position in first-class mill. He has worked in several of the best mills in New England for upwards of twenty years, and can show splendid references. Has worked on sheetings, prints, sateens, fancies, lenos and plaids. Now unemployed.

1353 **Overseer Cotton Weaving**, who has worked up from fixer to overseer in good mills, wants position paying $3.00 or more. Scotch, age 29; experience on all kinds sheetings and sateens.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines, 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

1333 **Overseer of Cotton Weaving** with more than 20 years' experience in weave rooms of N. E. and Canadian mills. Experience on all kinds of white and colored, plain and fancy work, except Jacquard, American and English, looms. Married; age 37.

1288 **Overseer of Cotton or Worsted** weaving wants position. Familiar with all kinds of looms; plain or fancy work. Age 45; married.

1343 **Boss Weaver or Spooler** whose long experience as a manufacturer in England of all kinds of spread and fancies, and later in Canadian mills from sheetings to dress goods and Jacquard work, qualifies him for a first-class position; highest references. Can start immediately.

1247 **Elastic** weaver wants position as overseer. Used to cotton web, elastic suspenders, silk neckwear, dress goods and handkerchiefs. 23.

FINISHERS.

1351 **Woolen and Worsted Finisher** with 7 years' experience as overseer in R. I. and N. Y. mills, from which he has excellent references. At present second hand in one of the best worsted mills in N. E. Habits first-class; age 29, married.

642 **Knit Goods Finisher** at present out of employment because of change in superintendent. Englishman who learned his trade in Nottingham and has since been overseer 14 years in large Canadian and American mills. Married, age 46. First-class manager of help.

1359 **Woolen Finisher** of all kinds of woolen goods; 20 years in charge, at three leading mills. At present out of employment; expects $4.00 a day. Age 45, married; references first class.

1041 **Woolen Finisher.** Has had experience on fancy and piece dyed goods, cassmeretes, cheviots, worsteds, kerseys and dress goods. Wants position as overseer or second hand in New England States. Age 26 years. Will work for $2.50 per day.

1330 **Expert Finisher** with 10 years' experience in European mills. Can do perfect work on highest grade cassimeres, serges, cheviots, kerseys, worsteds, astrachans. Age 34; married. German, speaks English imperfectly.

DYERS.

1302 **Young Dyer** wants position as second-hand or overseer in small mill. Has been under good men in well-known mills.

1354 **Dyer of Large Experience** both in woolen mills and in job dyehouses. A man of far more than average skill from raw stock to piece dyeing, dress goods, etc. Scotch, married; age 39.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one of the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Would be able to take charge of small high grade small plant.

1360 **Wool Dyer or Assistant,** 6 years' training as assistant on shoddy and wool piece dyeing. French American, age 24, single, well recommended.

1361 **Wool Dyer and Finisher,** large experience on blankets, all kinds of flannels, felts and dress goods. Early training in Scotland, 15 years in this country. Now employed, but wants to locate in the North near the sea. Age 40, married; now giving entire satisfaction.

1327 **Skillful Dyer** with experience on raw cotton and wool, indigo blue vats, slubbing, worsted and woolen yarn, piece dyeing on ladies' dress goods and men's suitings. Age 45; married. First class references from good mills.

1319 **Boss Dyer.** Wool, cotton, or raw stock. Alizarine colors; shoddy, carpet yarns, straw goods, beavers. Blue blacks, all kinds of fancy dyeing. Belgian. Age 29. A thorough master of his trade.

1323 **Dyer** of large experience on cotton chain and skein work. Age 40; married. At present employed, but wants higher wages. References from good mills.

KNITTERS.

1257 Superintendent of knitting mill wants position; is a finisher and understands every part of the business, including shipping all kinds of goods, fabrics, cotton, worsteds, silks, wool on all kinds of shapes, and flat goods; most all kinds of knitting machinery and finishing machinery; age 32; married; refers to past record.

1274 A man who thoroughly understands the manufacture of hosiery from the fleece to the case, and is a good manager. Desires to correspond with parties wishing to employ such a man.

1362 **Boss Rib Knitter**, young man, now second hand in fleece lined underwear mill in New York State wants to advance. Very highly spoken of by present employers as to both ability and character. Could change on short notice.

1317 **Knitting Overseer.** Wide experience. Age 36. Not married. Has worked on fleece lined underwear, elder downs, stockinet, jerseys, etc. Familiar with spring needle circular machines First class references.

1342 **Hosiery or Underwear Supt.** A practical knitter familiar with latch, spring needle, and sewing machines; nearly 15 years superintendent of New England hosiery mill, at present shut down. Good manager; references first-class. Age 47; married.

1338 **Boss Knitter** of sweaters, cardigans, etc., familiar with Lamb and and German machines; 6 years in charge of knitting for first-class manufacturers. Age 33, married. At present out because of mill shutting down.

DESIGNERS.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1263 **Assistant** Designer or Assistant Superintendent. Has received a practical mill experience, and is a graduate of the Philadelphia Textile School. Unions, cassimeres, suiting, cloakings. Age 24 years.

1252 **Designer, Weaver or Dresser.** Aged 40 years; married. Familiar with nearly all kinds of men's wear, piece dyes, etc. Refers to past and present employers.

1259 **Woolen Designer or Supt.**, 10 years' experience on meltons, kerseys, beavers, and dress goods. Thorough knowledge of color mixing and picking out. Best of references from past positions. Age 39, single.

1326 **Graduate Phila. Textile School** wants position as assistant superintendent or designer in cotton mill. Has also had 3 years' practical experience in mill. Very highest references.

1329 **Accountant or Secretary** thoroughly competent to assume full charge of any set of private, partnership or corporation books. Would take small amount of stock in Southern cotton mill and act as secretary and accountant. Temperate, energetic, excellent references. Age 30; married.

9999 **Superintendent Print Works.** Young man, 30 years of age, energetic and practical, graduate chemist, with thorough experience in printing, especially of silk (2 years in Europe and 4 in this country), seeks position as superintendent or assistant in print works. Address Chemist, care TEXTILE WORLD.

MISCELLANEOUS.

1300 **Wool Sorter** with experience in first-class English mill. Thorough knowledge of wool, noils, waste and all kinds of garnetting. Has not been employed in this country, but can give American references as to character.

1301 **Book-keeper and Paymaster.** Young man of the very highest character desires to move away from the Atlantic coast, on account of his health. Best references from his present and former employers.

1283 **Laboratory Chemist** with experience in large mills and supply house desires position. A moderate salary.

1336 **Beaming and Slashing.** Experience in Mass. and Me. cotton mills on ginghams, dress goods and all kinds colored goods. Age 30; habits first-class, good references. At present employed in large mill.

1335 **Loom Fixer or Second Hand.** Knowles and Crompton looms, fancy worsteds and cassimeres, dress goods. German; Protestant; age 37, married. Has been employed in good mills and is very well recommended.

1345 **Master Mechanic.** In charge of one large plant for past 16 years, and previous to that 6 years in charge for one of the largest mills in New England Capable of accomplishing best results at low cost; references from leading engineers and managers.

1346 **Chemist or Salesman.** Graduate Crefeld Textile School, colorist for German manufacturers, and since employed for 3 years in this country as colorist. Young man, single.

1341 **Dye-Stuff Salesman**, with experience in dye house for several years; many friends and relatives as dyers. Would start on small salary and expenses. Age 30, single. Might take second hand job in dye house.

1312 **Overseer Dresser.** Age 34. Married. Is at present working in a first class mill. Desires to change because of poor health of family. Can furnish first class references. Cassimeres, unions, woolens.

1363 **Twisting, Spooling, Warping** overseer. Experience on single and twisted yarns up to 2/100s in one of the best New England mills. Now employed as assistant; young man, but is confident that he could satisfactorily fill overseer position.

1356 **Second Hand Cotton Spooling**, warping, twisting, slashing, or could handle overseer position in small mill. Well recommended, now with good mill.

1202 **Silk Superintendent** is open for an engagement with a first-class company. Has a thorough knowledge of all the details connected with the manufacturing of silk ribbons and hat bands, from throwing to the finished product. Has held the position of superintendent of a first-class mill for several years. Under 30 years of age, and married. Has the best of references. For any further information address this paper.

1229 **Dresser.** Overseer of woolen dressing. Age 30. Men's wear and dress goods. Good references.

1228 **Shearer.** Wants position as overseer of shearing. Good man on cassimeres, worsteds, unions and cheviots. Age 25; married. References.

TEXTILE BOOKS.

The following are recent publications, which we will furnish upon receipt of their price.

Wool Dyeing, by William Gardner. 8vo, 91 pages, fully illustrated.

This is an attempt to deal with wool dyeing in a scientific manner, explaining the theories which underlie the different operations. Prominence is given to the practical side, and working details of all important processes are attached. Among the subjects treated may be mentioned the following: Wool Scouring; Bleaching Wool; Character and Impurities of Water; Mordants; Assistants, and other Chemicals. Price $2.

The Student's Hand-Book of Practical Fabric Structure, by H. Neville. 8vo., 235 pages.

The object of this work is to interest the student in the subject of weaving by a series of consecutive lessons in the principles of fabric structure. Free use is made of sectional diagrams, to show what actually takes place in producing any particular fabric. An idea may be had of the nature of the book from the following partial enumeration of the subjects treated: Design Paper and Its Uses; Plain Cloth and Its Ornamentation, Twilling, Drafts and Tie-ups; Spotting; Open-work Effects; Cords; Pile Weaving; Cross Weaving; and Backed and Double Cloth. Price $2.25.

The Printing of Textile Fabrics, by C. F Seymour Rothwell. 8vo., 312 pages.

This is a practical manual on the printing of cotton, wool, silk, and half-silk fabrics, with plates, illustrations in the text, and specimens of printed fabrics. The work contains but little information of a purely chemical or theoretical character, as it has been covered by the "Manual of Dyeing," by Knecht, and others. The author has confined himself more to the practical side of the subject, and the processes and machinery described by him are principally those with which he has had practical experience. Price $6.50.

Cotton Spinning, by W. S. Taggart

Two volumes of this work have been issued; the second volume brings cotton spinning down to the end of what is generally termed the preparing processes and includes all of the machinery and manipulations between the card and the self-actor, or ring frame. This work is esteemed of much assistance to the student. Price $1.75.

Ornamental Design for Woven Fabrics, by Stephenson & Suddards. 273 pages, 66 illustrations.

This is a text book dealing with ornamental design for woven fabrics, for the use of the student, and has been written for the purpose of suggesting helpful ideas to designers and manufacturers of textiles, and aims at bringing artistic textile work into practical touch and closer relationship with the technical requirements of manufacturing. It takes up such subjects as Geometric Design; How to Plan an All-over Repeating Design; The Drop Pattern; The Sateen Arrangements; Borders, Corners, Stripes; The Structure of Ornamental Flowers, Foliage, etc. Price $2.50.

The Power Loom, by Alexander Brown

This is a practical, well written treatise of 118 pages, on the construction of the power loom and the art of weaving, giving descriptions of the texture produced by different numbers of harnesses. The text is illustrated with diagrams, and contains calculations and instructions for the production of cotton, woolen, linen and jute fabrics. It was written with the intention of serving as a text book for those engaged in the trade. Notwithstanding it relates to English machinery, it is of value to those operating that of American make. Price $1.25.

Jacquard Weaving and Designing, by T. F. Bell. 300 pages. Fully illustrated.

The contents of this work have been derived from a long course of art and technical training, together with a lengthy practical experience in textile manufacturing and designing, by the author. The descriptions are as concise as is compatible with fairly clear explanation. Price $3.00.

Cotton Weaving and Designing, by John R. Taylor, 288 pages, fully illustrated.

This work is by a well known writer and lecturer on this subject, and treats of such topics as: Hand and Power Looms; Drop and Circular Box Looms; Dobbies; Jacquard and Leno Weaving; Terry Looms; Principles of Designing, Plain and Figured; and Textile Calculations. This work is of much value. Price $2.50.

Woolen Spinning, by Charles Vickerman.

This is a most excellent work for students in textile schools, and for skillful, practical men in woolen mills. It takes up the principles that underlie the various processes and operations of the earlier parts of manufacture. It has chapters devoted to Wool; Wool Sorting; Scouring; Bleaching; Mixing, etc., Carding and Spinning. 362 pages. Price $1.75.

The Student's Cotton Spinning, by Joseph Nasmith.

This is a standard book on spinning. It treats of mixing, opening, scutching, carding, card clothing, combing, roving, spinning, reeling, waste spinning, etc. 583 pages. Price $2.50.

Technology of Textile Design, by E. A. Posselt.

As a practical treatise on the construction and application of weaves, and the analysis of cloth, this is, in very many respects, the best work for the American manufacturer that is published. Price $5.00.

The Mechanism of Weaving, by T. W. Fox.

A treatise of 464 pages, presenting exact and practical information upon the principles of weaving. Takes up such topics as Harnesses; Shedding; Dobbies; Jacquards; Card Cutting; Picking; Pickers; Swivel Weaving; Beating Up; The Reed; Taking-up Motion; Temples; Trimming and Fixing of Parts. 256 illustrations. Price $2.50.

Manual of Dyeing, by Knecht, Rawson and Loewenthal. In three volumes.

Decidedly the best work of the kind for a proper understanding of the present state of the art of dyeing, for the use of practical dyers, manufacturers and students. It takes up such subjects as, Water; Acids; Alkalies; Mordants; Natural and Artificial Coloring Matter; Machinery used for dyeing, etc. Has numerous illustrations and specimens of dyed fabrics. Price $15.00.

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E. I. DuPONT de NEMOURS & CO., Wilmington, Del.

MACHINERY

Shafting, Hangers, Pulleys and Couplings. Machinery Steel in all sizes from 6 1-2 inches diameter down to 3-16 inch diameter, cut any length, always in stock. Cold Rolled Rounds, Squares, Flats, Hexagons, Octagons, Decagons, and all shapes finished to exact sizes. Everything in readiness to be shipped at once. Our goods are without a rival and our prices the lowest of all.

Telephone 314, South Boston.

COMPRESSED STEEL SHAFTING WORKS,

South Boston, Mass.

Cotton Mill Wanted

Parties wishing to locate a cotton mill in the South will do well to investigate the advantages of Tallapoosa, Georgia. Our locality furnishes best grade of cotton; has the best climate in the South; has a Northern settlement with school and church advantages; has 3000 people, free-stone water and cheap fuel. Address,

SECRETARY BOARD OF TRADE, Tallapoosa, Georgia.

Woolen Mill—West Virginia.

For Sale: A one-set mill, located in good wool growing country, at a great bargain. For complete information address C. K. BOWMAN, Evansville, W. Va.

WANTED.

A Gentleman with moderate capital to take an interest in a very desirable Yarn Commission business in New England. Address, "YARNS," care Textile World.

EDWARD JEFFERSON & BRO.,

Worsted .·. Machinery,

28 Strawberry Street,

PHILADELPHIA, - - PA.

SOLE AGENTS FOR

J. B. Farrar & Sons, Halifax, England,

Buggella Cork Rollers for Spinning and Drawing.

Ramie.

An intelligent and practical man, who has worked for a long time in one of the few successful factories in Europe which manufactures ramie into imitation silk, woolen and linen goods, would like to arrange with some manufacturer for the introduction of this industry. He understands all the processes from raw material to the finished goods; is able to spin the yarn up to 100s single.

Also understands how to color a fast aniline black without oxidizing, also how to color perfectly fast paranitraniline red in warps or skeins. Address

"AMERICAN CITIZEN," care Textile World.

Traveling Salesman.

Situation wanted by an experienced traveling salesman, who is posted in the underwear and hosiery line, and commands a good trade through Wisconsin, Minnesota, Iowa and Northern Michigan. Can furnish best of references. Age 35. Address, P 158, care Textile World, Boston.

Hosiery Mill For Sale or To Let!

A new plant, capacity 100 dozen per day.

Water Power To Let, 400 H. P., with excellent buildings.

W. M. DANA. Westbrook, Maine.

Hosiery and Underwear Accounts

Wanted for New England by salesman with established trade with large retailers and jobbers. Address

"P 160," Textile World,.

Frank A. Stevens, *Pres.* Arthur H. Mason, *Treas*
Capital Stock, $500,000.

Sanford Spinning Co

FALL RIVER, MASS.

30,000 Spindles. Weekly product, 50,000 pounds 14s to 40s.

NOVELTY COTTON YARNS,

FROM AMERICAN PEELERS AND EGYPTIAN COTTONS.

OUR SPECIALTY: Superior qualities of Hosiery Yarns, Natural Shades of Cottons, and in Colors, Jaegers, Mixes, and Bleached, Hosiery Cops on Long Tubes, Skeins, Tubes, Cones and Lisle Thread Yarns. Furnished in Carded and Combed Qualities in Singles, 2, 3 and 4-plies.

ROBERT W. SCOTT. LOUIS N. D. WILLIAMS.

Scott & Williams,

KNITTING MACHINERY.

PHILADELPHIA,

OFFICE AND FACTORY:
2097 E. Cumberland Street. Pa., U. S. A.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. Spinners are having a good trade both in heavy and light weight yarns, and prices are fairly well maintained. All the business doing is practically on cotton yarn. Fleeced back goods are having an exceptionally good run. Knitters arer unning the light-weight season as long as possible to save all the wool they can. The heavy yarns are being sold at this time for the next heavy-weight season. Colored yarn for ladies' underwear is going to be used largely in Silver Gray, and men's underwear calls for Jaeger. Numbers used 1/8s to 1/10s. The balbriggan underwear continues in good demand and the yarns used are 40s, 44s, and 50s. Much lisle yarn is being sold for ladies' light-weight underwear in 2/42s and 2/50s. Combed Egyptian and Combed Lisle prices are well maintained. Hoisery is selling well at this time.

We quote

7/8 white cops	12¼ cts.
10s " "	13 cts.
12s " "	13½ cts.
14s " "	14 cts.
16s " "	14½ cts.
18s " "	15½ cts.
20s " "	16 cts.

Silver gray and Jaeger.

10, 11, 12	15 cts.
14	15½ cts.
16	16 cts.
18	16½ cts.
20	17 cts.

Combed Egyptian, 1/20,	23 cts.
" " 1/30,	29 cts.
" " 1/40,	33½ cts.
" " 1/50,	36 cts.

Woolen Yarn. Spinners are getting few orders although many inquiries have been made and many sample orders secured, but no lot orders have been placed. The mills running are those which purchased stock at a low price. Judge Lawrence seems to think, according to his letter in the Textile World, that the duty on wool should be higher. If he could see the amount of cotton being stuffed in woolen goods at this time, he might not think that a high duty on wool was altogether the salvation of the wool growers.

Everyone is down on his luck so far as woolen yarn is concerned. The better grade, of woolen goods requiring woolen yarn are not being called for, and knitters of hosiery are getting no orders to warrant them placing the same.

Many inquiries have been forthcoming. There are exceptions to every rule, and we know of one spinner who, during December and January, took many orders, but this mill was manufacturing a strong warp yarn out of shoddy, and so strong is it, and so smooth is the thread, that the profits have been extraordinary. Underwear is in an unsatisfactory shape. Knitters of fine woolen underwear are getting no orders except where wastes are used in good quantities. We note that many of the successful mills are buying thread waste and are putting in garnetted stock. In this way they get up goods for about 53 cents, against 70 and 73 cents for all wools. This seems to be the only way out of the difficulty, and mills will be forced into it. Some believe that next fall the mills will have more orders than they can swing, because buyers must have fine goods, and if they do not order now they will be obliged to do so later, and the knitter who starts in and makes goods on speculation now, will be a winner.

Worsted Yarn. Spinners are getting

(Continued on page 131.)

Frank T. Patterson, Prest. Oscar W. Wood, Treas

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

numbers from 6s to 26s.

Germantown, Philadelphia.

Glazed, Bleached and Dyed

YARNS

Cone Winding.

W. WARREN THREAD WORKS.

WRITE US WHAT YOU USE, WE WILL DO THE REST.

WESTFIELD, - MASS.

WOOLEN YARNS.

Single, also Double and Twist For Weaving Hosiery.

COVERT CLOTH YARNS A SPECIALTY.

Raw Stock and Piece Dyeing.

CLEAR RIVER MILLS,

PASCOAG, R. I.

(Continued from page 129.)

few new orders, although they are fairly well sold up on orders placed early in November and December. Some spinners, hoping for better prices, kept out of the market and cannot secure orders at this time. The heavy weight season can hardly be said to be underway, although manufacturers are having orders cancelled which were taken the early part of the season. It is a curious situation that we are in. Some mills own stock purchased at low figures and before the 11-cent-per-pound duty was placed on grease wool, and also have worsted yarn purchased on a free wool basis. These manufacturers, finding that they got no orders at high prices, are making cloth at very near old prices. Besides this, many of the jobbers are trying to break prices by claiming that certain manufacturers are selling at lower than regular prices, or at prices less than those at which goods were sold earlier in the season. Some weavers are trying to keep up with the procession by manufacturing all-wool goods out of cotton, or anything else, to reach the buyer's figure. The greater factor regulating prices, the same as was the case last year, is due to the ingenuity of certain weavers who are making a lower grade of worsted goods at the old prices. For instance, where weavers have been using a No. 2/26s and worsted filling, they are now producing the same thing, apparently, with a No. 1/14s, and wool or cotton filling or shoddy. Where No. 2/40s have been used, the number of picks per inch has been lessened and No. 2/30s substituted. The census of opinion is that as the heavy weight season advances, better grades will be purchased. Buyers are all bluffing. It is very much as a large manufacturer said the other

(Continued on page 134.)

ALBERT R. ELSASSER,
Clifton Worsted Mills.
WORSTED YARNS
MILLS: ADDINGHAM, DEL CO., PA.
Phila. Office, 431 Chestnut St.

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

SAWYER, MANNING & CO.,
YARNS,
36 & 38 Franklin St., NEW YORK.

ALEX'R KING & CO.
YARNS.
FINE IMPORTED YARNS A SPECIALTY.
54 Leonard St., New York.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
51 & 53 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

O. S. HAWES & BRO.,
WEAVING and HOSIERY YARNS,
All Plies and Numbers.
Imported Yarns a Specialty.
82 and 84 BEDFORD ST., FALL RIVER, MASS.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON WARPS
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 40s and above. AND
FITCHBURG, MASS. WARPS

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino YARNS
PAWTUCKET, R. I.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

SILK LUSTRE COTTON YARNS

In single and two or more plys. This yarn retains its lustre through all usages and is increased in strength twenty to forty per cent.

High Grade **COTTON WARPS** and **NOVELTY YARNS.**

Printers of Cotton, Wool and Worsted Yarns.

The J. R. MONTGOMERY CO.,

. . . . . WINDSOR LOCKS, CONN.

PLAIN AND FANCY PATTERN

Cotton Warps,

WHITE, MIXED AND COLORED.

For SATINETS, BLANKETS, ETC.

WHITTIER COTTON MILLS,

LOWELL, MASS.

INDIAN ORCHARD CO.,

Indian Orchard, Mass.

MANUFACTURERS OF

Lustred Cotton Yarns.

In Various Colors and Twists.

NOVELTY YARNS

In Cotton, Silk and Worsted, in various patterns and colors.

Cotton Warps and Yarns

In Gray and all colors, single or 2, 3, 4 and 6 ply, and Cable Cord.

COLORED COTTON

Machined, Carded or in Roving.

(Continued from page 131.)

day: "When you go to New York to sell your goods one would think that the world was coming to an end, so bad is the business outlook, but on the other hand when one struck Boston, he was led to believe that the millennium had been reached or was about to be reached that wool was going up higher and higher, that the stock of wool in both continents was short, etc." How he was going to reconcile both factions bothered him. Astrachan cloth is being put on the market, and prices for lustre yarn are fairly well maintained.

We quote:

2/40s Australian	$1.07½
2/50s "	1.15
2/20s, 3/8s Blood	.60
2/36s, 1/2 "	.75

Speaking of cotton worsteds, we had an interesting talk with the originator of the famous Rhode Island cotton worsted fabric. We asked him how he conceived the idea at first. He said he tried twisting a cotton thread with a worsted thread, but this made too harsh a fabric, which would almost stand alone. After a while he evolved the idea of initiating the finest worsted fabrics, like those produced by the Rockville, and other fine worsted coating mills. He accordingly purchased the finest yarn possible and added a cotton thread which was so manipulated that it could not be detected in the goods. These imitation all-worsteds, made after the best and latest Rockville designs, were sold $1 or $2 under the Rockville prices. He said he ran 3 years on this product before the other mills got on to it and in nearly all that time he made $1 per yard; of course, he said, it was a chance in a life time. Many mills are imitating worsted cloths. We saw some beautiful fabrics which looked

(Continued on page 135.)

KERR THREAD CO.
—SPINNERS OF—
Fine Combed Sea Island **COP SINGLES**
All Numbers, 30s to 150s.
Fall River, Mass.

WOOLEN AND MERINO YARNS.
Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER, - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns (Simile).

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist,
COTTON WARPS
4s to 60s.
HOUSATONIC, MASS.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 plv cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

AMERICAN SPINNERS'
Cotton Yarn Exchange.
COMBED AND CARDED COTTON YARNS
From Northern and Southern Mills.
ARNOLD B. SANFORD, - MFRS. AGENT,
226 Devonshire Street.
BOSTON - - - - MASS.

Cotton Yarns AND WARPS Of Every Description.
James F. White & Co.
COMMISSION MERCHANTS,
54 an 56 Worth St., NEW YORK.
228 Chestnut St., PHILADELPHIA.
BURLAPS all WIDTHS and WEIGHTS.

YARNS All Numbers and Qualities.
HOLLAND & WEBB,
487 Broadway, New York.

NEW ENGLAND THREAD CO.
PAWTUCKET, R. I.
Manufacturers of Spool Cotton & Supefine Tapes
Thread and Yarn on Tubes and Cones for the Hosiery trade etc. Thread dressing a specialty, for weaving purposes. Dyers and Bleachers of Threads, Yarns and Tapes.

A copy of the Textile World's Directory is presented to every paip-up subscriber of the Textile World, with the compliments of the publishers.

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almost exactly like worsted, made from combed wool. It had the hard worsted effect, and it was a very good imitation. We know of one very large weaving mill which is resorting to this sort of thing. We note in our observations that the western orders are very large and satisfactory. We have heard from one salesman just returned from the West that he has had the most satisfactory trip in his experience as a salesman. This is not so with Eastern trade, as salesmen selling yarn know to their sorrow. Cheap trash, and the better goods sold at nearly old prices, are the only things selling.

Philadelphia Yarn Market.

The prices of cotton yarns have been maintained in most sorts the past month, in face of the continued low price of cotton. Two-ply warps and skein are held at full prices, and Eastern hosiery yarns also continue at full prices. The most of the Southern yarns, except in the low counts, are very firm in price, except for some irregular or job lots, in a small way. Southern mills are fully sold up; the most of them for two to four months ahead, with no present prospect of a decrease in business.

We quote:—

WARPS.

20/1	12½ to 13 cts.
22/1	13 cts.
26/1	14 cts.
12/2	14½ to 15 cts.
14/2	14½ cts.
16/2	14½ to 15 cts.
14/1	12½ cts.
16s	12½ to 13 cts.
20/2	16 cts.
30/2	19 cts.
30/2 Eastern	19 to 19½ cts.
40/2 Eastern	24 cts.

(Continued on page 137.)

O. H. HAYES & CO.

Will make liberal arrangements with Woolen Manufacturers to handle their productions.

O. H. HAYES & CO.

B. F. BOYER & CO.,

Successors to GEORGE SHIMER & BOYER,

HOSIERY YARNS,
In Wool, Merino and Worsted.

COLF YARNS,
In Wool and Worsted. Also carry a full line

BUNDLE YARNS
For the Jobbing Trade.

516 Market St., Philadelphia.
MILLS, CAMDEN, N. J.

BOTANY WORSTED MILLS,

PASSAIC, N. J.

Fine Worsted Yarns,

— AND —

Fine Woolen Yarns

— IN THE —

GREY, COLORS and MIXTURES.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

Eddy & Street,
COTTON, WOOLEN, **YARNS** AND **BRAIDS** WORSTED, SPUN SILK.
PROVIDENCE, R. I.

Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & Co, Philadelphia and Boston.

THE PHOENIX MILLS CO.,
MANUFACTURERS OF
Fine Worsted Yarns.
Correspondence Solicited. Samples furnished on application.
BOSTON OFFICE: 620 Atlantic Ave. Rooms 10 and 11.
PHILA. OFFICE, MILLS: 10th & Germantown Ave., Phila. Chester, Pa.
No. 13 LETITIA ST.

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:
Broadway and Jefferson Avenue,
CAMDEN, NEW JERSEY.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

Worsted YARNS,

ALL NUMBERS SINGLE AND TWO-PLY,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes

Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns only.

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns for Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued from page 135.)

SKEIN.

26/1	14 cts.
20/1	13 to 13½ cts.
19/1	13 to 13½ cts.
4s to 10s	11½ to 12½ cts.
12s soft	12½ to 13 cts.
20/2 medium	15½ cts.
14/2	13 to 13½ cts.
30/2	18 to 18½ cts.
30/2 Eastern	19 cts.
26/2	17 to 17½ cts.
40/2	23½ to 24 cts.
8/3 carpet	11½ to 11½ cts.
10s double reeled	12 to 12½ cts.
16/3 slack	13 to 13½ cts.
16/4 medium	13 to 13¼ cts.
16/2 " "	13½ cts.
9/4 slack	11½ to 12 cts.

SOUTHERN CONES.

6s to 8s (according to quality)	12½ to 13½ cts.
10s	13 to 14 cts.
12s	14 to 14½ cts.
14s	14½ to 15 cts.
16s	15 to 15½ cts.
20s	16 to 16½ cts.
24s	16 to 17 cts.
26s	17 to 17½ cts.

SHUTTLE COPS.

6s to 8s	12½ cts.
12s	13 cts.
16s	13½ cts.
26s	13½ cts.
40s	18 to 19 cts.

MIXED COLORED CONES.

6s to 8s	14 cts.
10s	14 to 15 cts.
12s	14½ to 15½ cts.
14s	15 to 16 cts.
16s	16 cts.

Egyptian, 4 to 5c. above white.

Combed yarns, 4 to 5c. above carded.

Woolen and merino yarns still very dull. Spinners are taking any sort of orders they can get to run their mills, either in all cotton or all wool, or mixed.

Worsted is in good demand. Spinners are busy, although some complaint is made that merchant tailors have not disposed of their high-priced stock as thoroughly as they expected to do.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

BURNET & CO., 24 George Square, Glasgow, Scotland.
All numbers and qualities of Cotton Yarns, specialties in
"Silkoline," "Ramie" and Fancies.
Also bleached filling on long tubes. Turkey Red, etc.
A B C CODE USED. TELEGRAPHIC ADDRESS "TENRUB, GLASGOW."

GEORGE SHIMER & SON,
Spinners of Worsted Yarn for the Weaving and Knitting Trade.
All kinds of Fancy Yarns for the Knitting Trade.
5th and Erie Sts., Camden, N. J.

WEAVING and HOSIERY YARNS.
We Buy for Cash
WARPS, COPS, TWIST and SOFT SKEINS, Single, Double, 3-ply, 4-ply, etc.
COLORED YARNS for HOSIERY
on Cones, a Specialty.
Correspondence Solicited.
EDWARD S. HYDE, 223 and 225 Chestnut Street, PHILADELPHIA PA.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.

79 Chauncy Street, BOSTON.

186 Franklin Street, CHICAGO.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

C. J. LITTLEWOOD & SONS, Ltd.

ALBION

DYE and BLEACH WORKS,

MANAYUNK, PA.

DYERS of Cotton, Cotton Yarns, Wool and Raw Stock Generally. **BLEACHERS** of Cotton and Cotton Yarn.

CITY OFFICE: 132 Chestnut Street. Telephone Connection,

PHILADELPHIA. MAIN OFFICE AT THE WORKS.

YARNS

SOLIS - - BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 546 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

Boston Finishing Works

WILLIAMSTOWN, MASS.

BLEACHERS, DYERS AND FINISHERS

Of Pure Finish Shirtings, Sheetings, Canton Flannels and Filled Good Also Silesias, Satteens, Corset Jeans, Cambrics, Sleeve Linings, Pocketings, Flannelette, and all descriptions of Dyed Goods.

NAPPING A SPECIALTY.

Being equipped with the French and other Foreign and Domestic Napping Machines we are prepared to give any kind of Nap required, including the French FlannelFinish.

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co.,

BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,
28 BAYLEY ST., PAWTUCKET, R. I.

INDUSTRIAL DYEING AND FINISHING WORKS,

Dyers and Finishers of WOVEN AND KNITTED FABRICS,

And Cotton, Wool and Worsted **Yarns and Warps.**
Consolidation of John G. Campbell & Co. and World Dyeing Works.

3829-3845 Frankford Avenue, - - - - PHILADELPHIA.
City Office: 240 CHESTNUT STREET. Telephone F'd 50.

FAST COLORS

for Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 79 MURRAY ST. NEW YORK.

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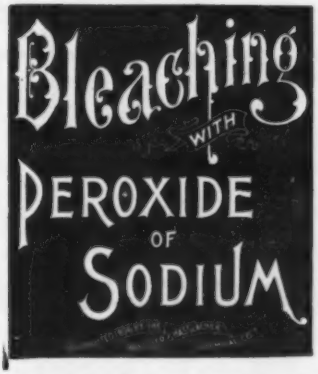

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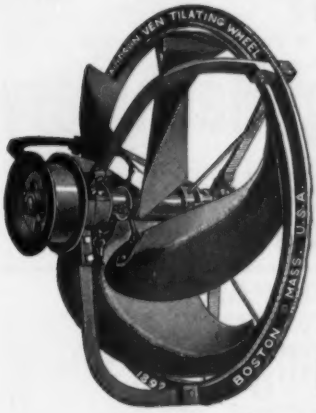

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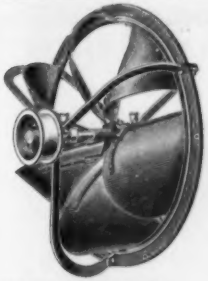

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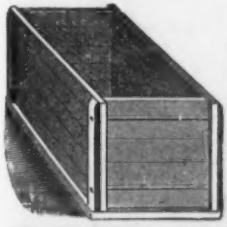

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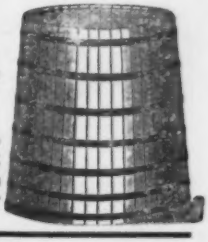

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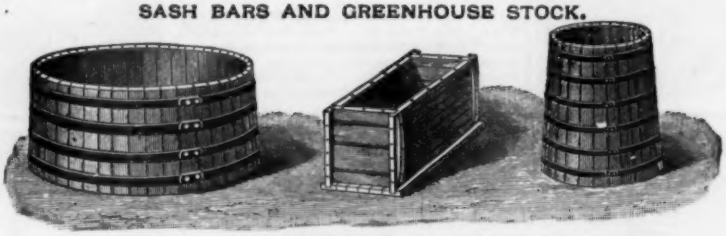

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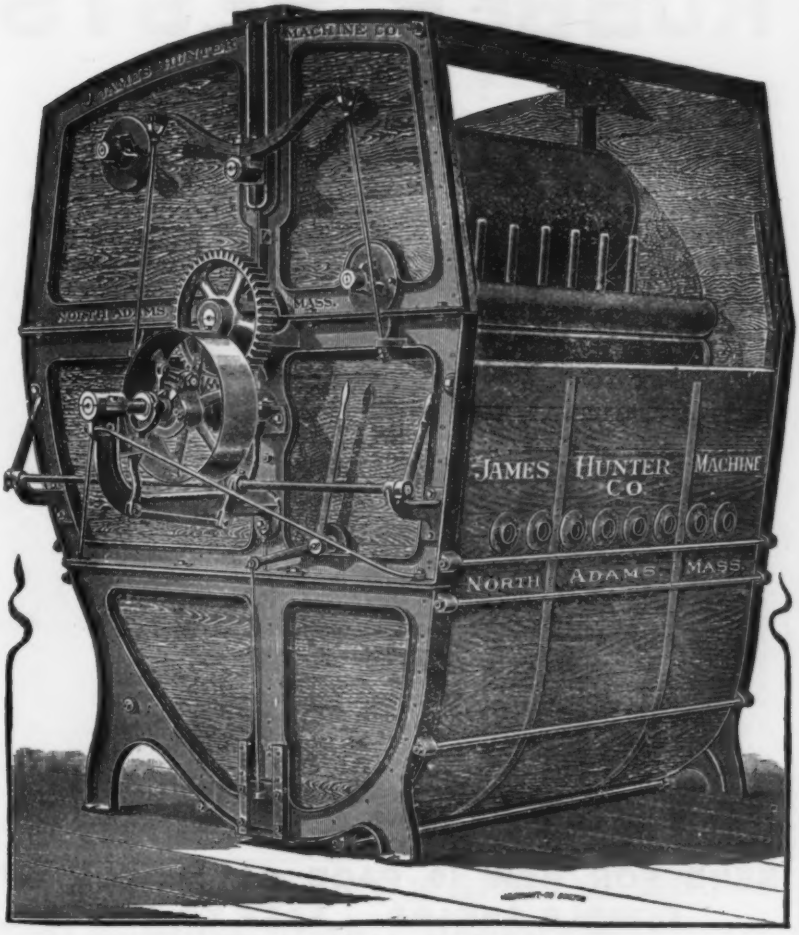

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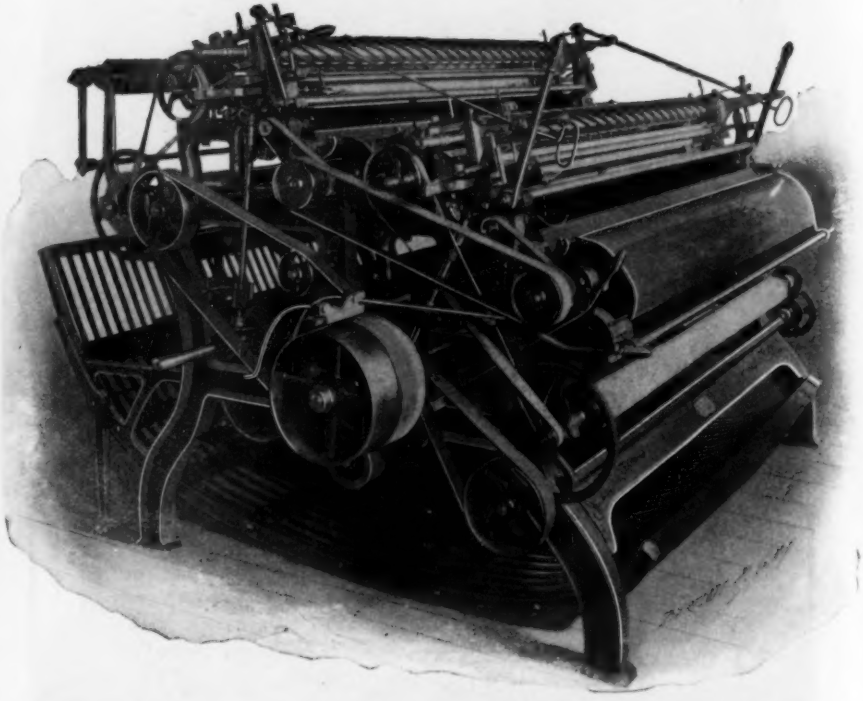

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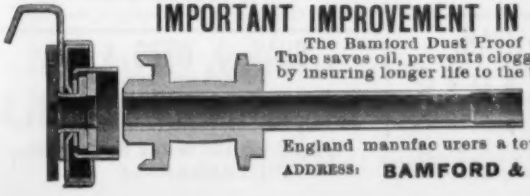

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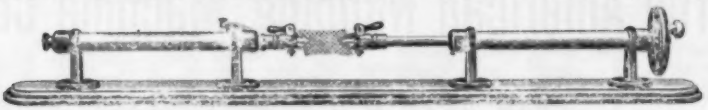

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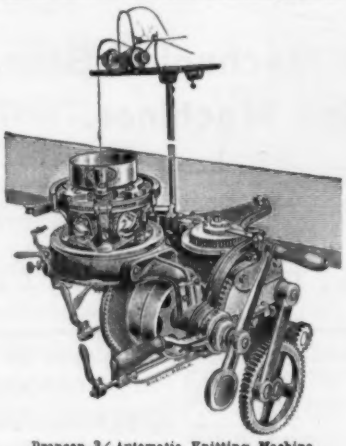
Power,
Open Top or
Hold Down,
Semi or
Plain,



Branson ¾ Automatic Knitting Machine.

Welt or
Two-Feed
Ribbers.
Loopers and
Parts.
Presses and
Boards.

¾ Automatic Knitters,

All Sizes and All Gauges.

WINDERS and BOBBINS. HAND FORGED STEEL CYLINDERS.

BRANSON MACHINE CO.,

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WRITE FOR INFORMATION AND CATALOGUE.

Yarn wound in conical form on "Universal" Machines gives perfect results in knitting and saves all rewinding.

There are no cobwebs on the ends of the cones, and therefore no waste or catching, in drawing off the yarn.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

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G. W. PAYNE. G. M. FANNING.

ESTABLISHED 1865 BY PAYNE & MATHEWSON.

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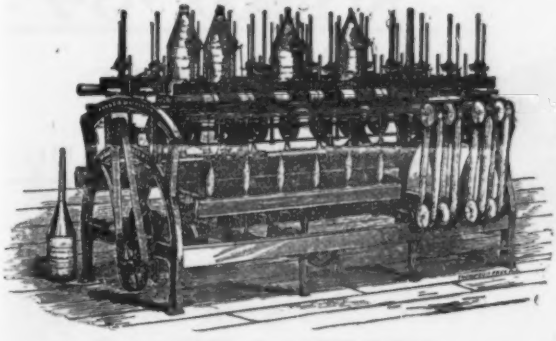
Machinists and Builders of the

IMPROVED UPRIGHT SPOOLERS. To Spool from Cop, Skein or Bobbin.

PATENT CONE WINDERS. (For Hosiery Manufacturers.) Wind from Cop, Skein or Bobbin.



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Ring Dresser, Spooler, and Reel Spindles, Cop Skewers, Warp Spools, Spooler Guides, Bolsters and Steps Made and Repaired at Short Notice.

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Manufacturers of

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INCLUDING

Pepper's Flat-Ribbed Cuff Machine,

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CIRCULAR RIBBED MACHINES,

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CORRESPONDENCE SOLICITED.

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—: BUILDERS OF :—

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For RIBBED UNDERWEAR, CARDIGAN JACKETS, SWEATERS, CUFFS, ANKLETS, ETC.

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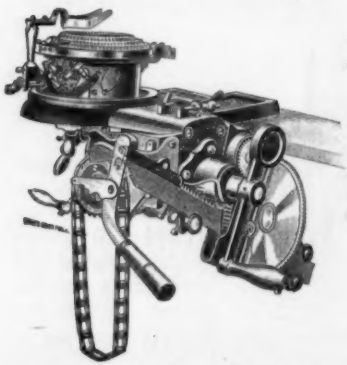
The principle upon which the Leighton is built has advantages that every manufacturer should investigate. Our Underwear machines of 9 inch and larger have 8 or more feeds.

Excelsior Knitting Machine Manufacturing Co.



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Knitting Machine.

With or without Double Sole Attachment.

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The Acme Automatic Knitter

Produces the greatest variety of seamless hosiery of all kinds and gauges. This machine will produce anything from a short foot to the longest hose without substituting or changing any parts whatever.

Its Range of Work is from very coarsest up to 200 needle cylinders.

It is unequalled for either Coarse Socks or Finest Ladies' Hose.

We invite Comparison

All Along the Line.

Seam in heel and toe remarkably strong and close, and heel is large and full.

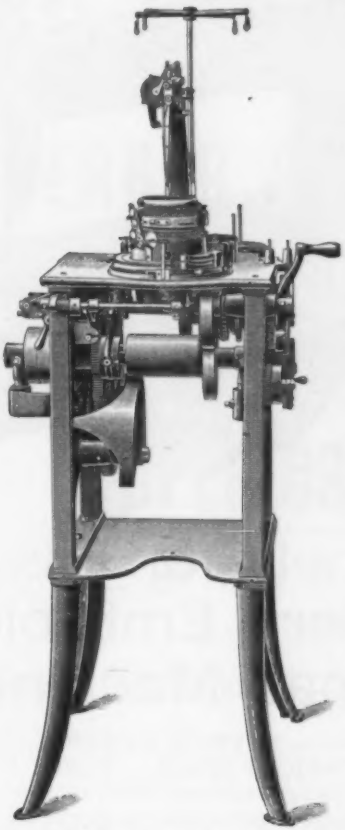
Extra thread in heel does not show in instep.

For shaping, or to accommodate varying reinforcing threads, the

Length of Stitch and Tension are Automatically Regulated. At any point.

Every movement positive and fully automatic.

Best method of *transferring ribbed legs and tops.*



High Spliced Heel

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It has the *only* perfectly practical *automatic device* for changing the yarn in heel and toe.

It is Extremely Easy on Yarn

Light Running, Simple, Durable, and Economical.

A mill fitted with our machines can produce a far greater variety of weights and styles than any other machine on the market.

Improved and perfected by years of practical factory test, it has an established record on all grades, and, **may fairly be termed**

A UNIVERSAL MACHINE.

Let us prove these statements in your mill.

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THE CRAZE!! THE CRAZE!!

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This machine produces the **CHAIN STITCH** ornamentation on finished goods, either in **STRAIGHT LINES** or **FANCY FIGURES;** embroidering plaid or plain stockings and hose, which are now very much in fashion, and whose importation is prohibited by the tariff. Easily and quickly operated.

To be seen in practical operation at the warerooms of the

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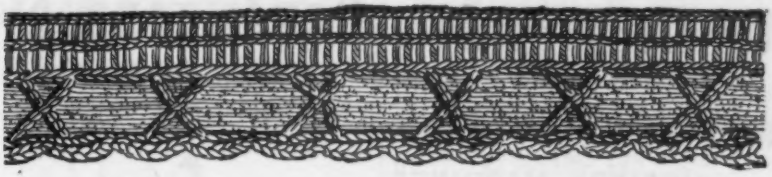
SPECIAL NOTICE.—Also Sole American Agent for the new Kohler Whip-Stitch Machine for all kinds of woolen and knit goods.



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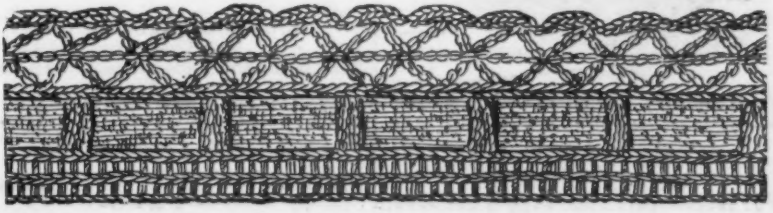

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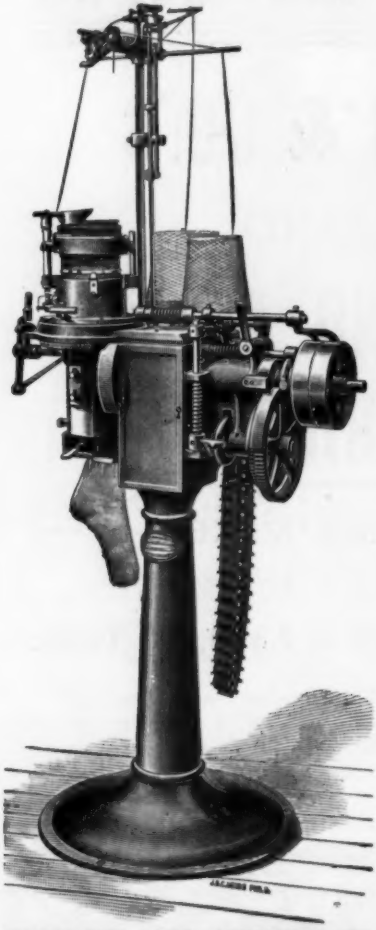

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Gives greatest production, fewest menders, less cost for maintenance and best fabrics.

More Standard in use than any Automatic Machine on the market.

The best, therefore the cheapest.

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Estimates furnished for complete Hosiery plants.

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AUTOMATIC KNITTING MACHINE

FOR

Seamless Hosiery, Wool, Cotton or Silk,

From the Coarsest to the Finest Gauge

Among the many strong claims for this machine are

The Highest Speed,
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AUTOMATIC AND PLAIN,

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.

ESTABLISHED REPUTATION FOR

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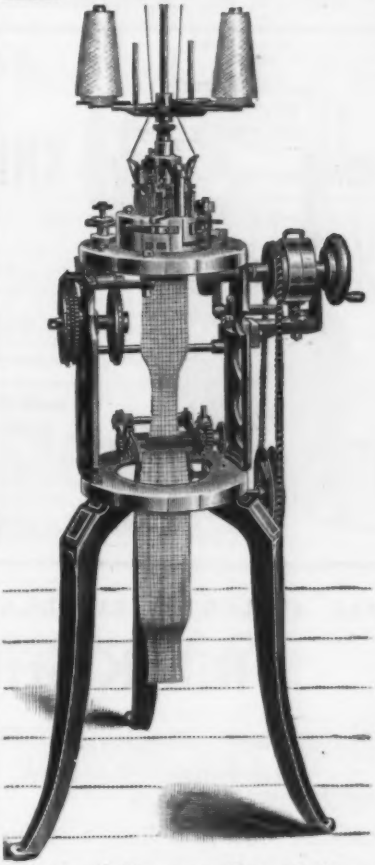

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To Seamless Knitters, make Old Machines into New Ones, and the Best of their respective classes.

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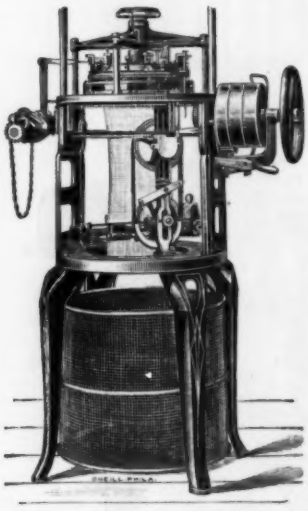
Makers of Wrought Steel Cylinders and Dials for all kinds of Machines.



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For Underwear, Sweaters, Jackets, and Bicycle Hose.

Latest Improved Weight Take-up. Highest Grade. Highest Speed. Sectional Dial Cap and Cylinder Ring. Rigid Dial Support.

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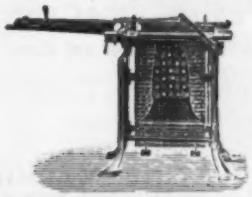
Flat Knitting Machines



For Scotch Fancy Pattern Golf or Bicycle Stockings, Fancy Sweaters, Gloves, Mittens, Caps, Cardigan Jackets, Ladies' Skirts, etc. Seamless Shaker Sweaters (both armholes automatic, selvedge open), Theatrical and Athletic Tights. Four section full automatic power sweater machine. Four section full automatic, full-fashioned sleeve machines with automatic widening of the fabric.

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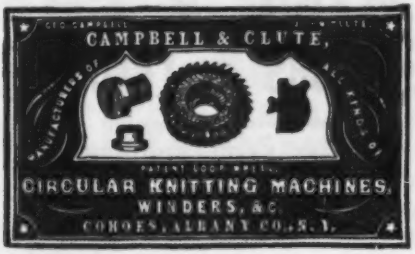

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Delicate Adjustment, High Speed with Durability.

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Sewing Machines, with or without Trimmers,

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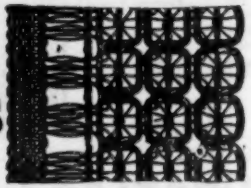

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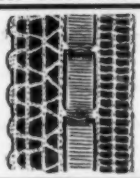

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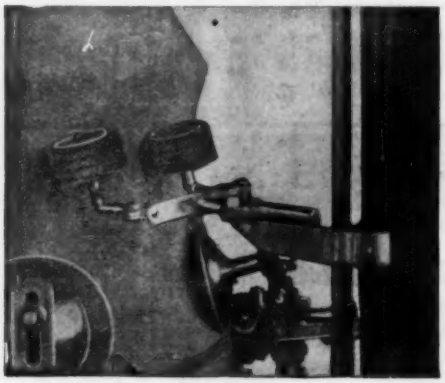

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LEFFEL'S STANDARD, SPECIAL SAMSON & CASCADE

UPRIGHT AND HORIZONTAL.

Suitable for all Heads from 3 Feet to 2000 Feet.

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Designing and building Water Wheels for all purposes and situations. These wheels secure a **High Guaranteed Percentage; Great Steadiness** under variable loads; an **Unequaled Concentration of Power,** and an **Unprecedented High Velocity. Its quickly operating balanced gates** afford **prompt** and **fine regulation** by governor.

Satisfaction Guaranteed where others fail. Write for catalogue of either wheel.

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Upright and Horizontal from 3 Horse-power upwards.

AUTOMATIC AND PLAIN SLIDE VALVE ENGINES.

Send for pamphlet illustrating and describing the Boilers and Engines.

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MANUFACTURERS OF

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GEARING of all kinds, **SHAFTING, PULLEYS,** and everything required for complete **POWER PLANT.**

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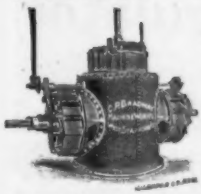
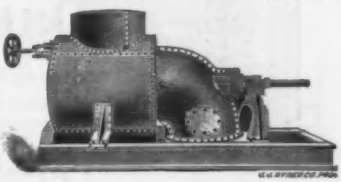
The C. P. Bradway Turbine Water Wheel.





Through its peculiar gate construction, it is guaranteed to give better results with variable quantity of water, than any other wheel. The peculiar advantages of this wheel cannot be shown by a picture, but can easily be demonstrated to any practical man. The full gate principle at all stages of gate opening, and gate shut tight first, last and always. Will sheer off obstructions. On, two or three wheels can be set on one base. I adapt wheels to any conditions, and guarantee satisfaction. My new regulator is the simplest in construction and the most efficient in result of any in the market. It is connected to the gate either by gears or chain bolt and sprocket wheels. **Price of Regulator $100.** I also make water motors, governors, steel tubing, grinding mills, and general mill machinery.

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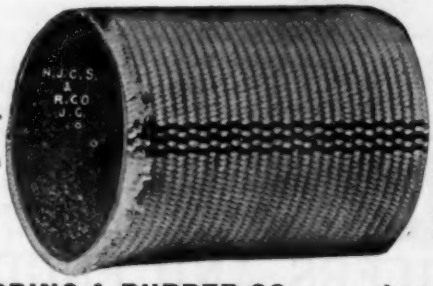

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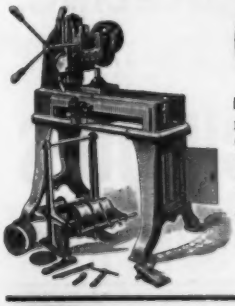

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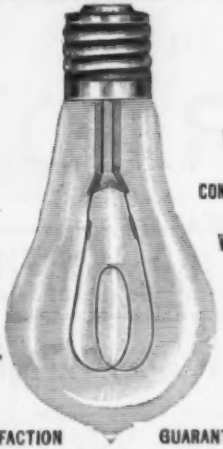

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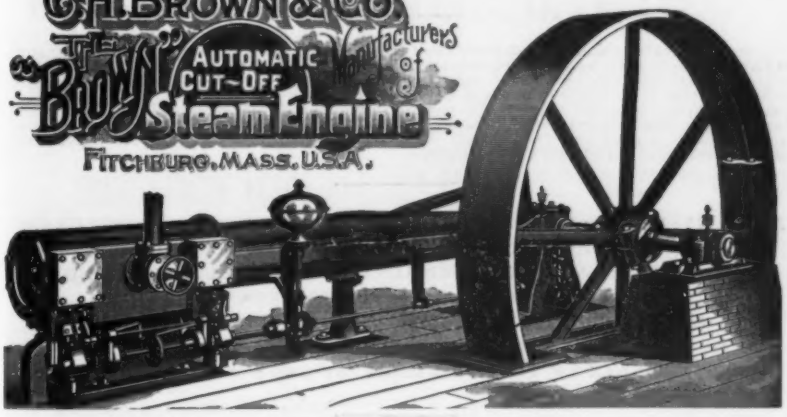

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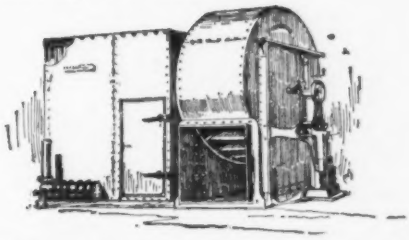

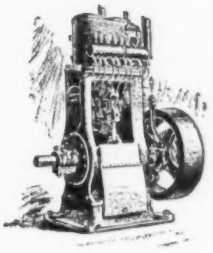

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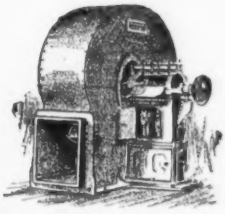

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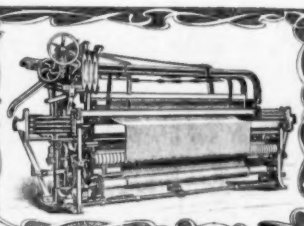

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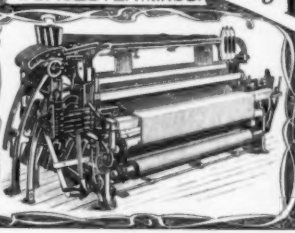

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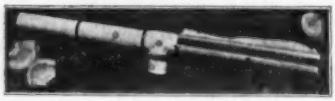

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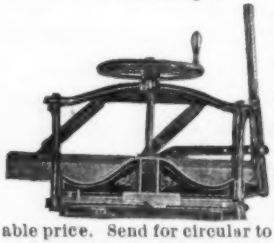

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